QL
377
C6B8X
Invert
Zool.

Catalogue

OF

LITHOPHYTES.

1870. 3s.

573.6

Studer Arch. f. Naturg. 1887, I

QL
377
C6B8X
Invert.
Zool.

593.6

CATALOGUE

OF

LITHOPHYTES OR STONY CORALS

IN THE

COLLECTION

OF THE

BRITISH MUSEUM.

BY

J. E. GRAY, F.R.S. ETC.

SMITHSONIAN
SEP 23 1986
LIBRARIES

LIBRARY, U.S. NATIONAL MUSEUM
126582
MAR 24 1884
SMITHSONIAN INSTITUTION

LONDON:
PRINTED BY ORDER OF THE TRUSTEES.
1870.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

PREFACE.

The object of the present Catalogue is to give a List of all the genera and species of the family of the Stony Corals, or Lithophytes, known to exist in the collections of Europe and America. The letters B.M. after the specific names denote those species that are now contained in the Collection; and the absence of those letters indicates the species which are desiderata, and therefore desirable to be procured for the collection.

This is the second part of the 'Catalogue of Polypes and their Corals.' The other Parts are in preparation.

J. E. GRAY.

British Museum,
July 8, 1870.

CATALOGUE

OF

LITHOPHYTES OR STONY CORALS.

Class POLYPES OR CORALLIARIA.

Order I. ZOOPHYTARIA.

Suborder II. RUPICOLÆ.

Coral social, tree-like or expanded, fixed by an expanded base, supported by more or less abundant, fusiform, calcareous spicules. The mass of polypes or corals often supported by a central calcareous or horny tree-like axis with an expanded base. Living attached by the base of the coral and axis to rocks &c. on the sea-shore.

Polypiers corticifères, *Lamk. A. s. V.* ii. p. 288.
Polypes corticaux, *Cuvier, R. A.* 1817, iv. p. 78.
Corallea, *Blainv. D. S. N.* lxx. p. ; *Man. d'Act.* p. 501.
Gorgoniadæ, *Johnston, B. Z.* p. 182; *Gray, List of Brit. An. in B. M.* i. p. 55.
Gorgonidæ, *Dana, Zooph.* p. 637. n. 181.
Ceratocorallina, *Ehrenb. Corall. r. M.* 1834, p. 142.
Coralliadæ, *Gray, Syn. B. M.* 1840, p. 134.
Gorgonidæ, *Milne-Edw. & Haime, Corall.* i. p. 134; *Kölliker, Ic. Hist.* p. 135.

I. *Polypes social, growing closely side by side, forming a fleshy crust, the young polypes being developed from the ends of the branches, or in the centre of the disk.*

Section I. *Axifera.*

Social polypes, supported by a central horny or calcareous axis, and attached to marine bodies by the expanded base of the axis, and the mass of polypes.

Gorgoninæ, *Milne-Edw. & Haime, Corall.* i. p. 134; *Kölliker, Ic. Hist.* p. 135.

"The polypes are short, cylindrical, connected laterally by a porous cœnenchyma at their bases, by a common membrane, and by specialized longitudinal canals, and arranged around a firm central axis, which is secreted from the common basal membrane. The communities are attached to foreign bodies by the expanded base of the central axis."—*Verrill, Mem. Boston Soc. Nat. Hist.* 1862, i.

Synopsis of Suborders.

I. **Lithophyta.** The axis calcareous, continuous or separated transversely into joints.

II. **Ceratophyta.** The axis horny, continuous.

III. **Solenophyta.** The axis expanded, coriaceous, foliaceous, folding into a more or less perfect tube, with tubular branchlets.

IV. **Suberophyta.** The axis soft, cork-like, with interspersed spicules, sometimes so numerous as almost to form the entire axis.

Suborder I. LITHOPHYTA or LITHOPHYTES.

Coral aborescent. Axis calcareous, continuous or jointed, effervescing with muriatic acid.

Lithophyta (Lithophytes), *Gray, P. Z. S.* 1857, p. 282.

The axis is generally entirely stony and hard, and usually of a white colour; but in *Corallium* it is generally deep bright red, but sometimes pink or white. It is usually solid, and formed of concentric laminæ. In *Melithæa* it is cavernous, pierced with cylindrical tortuous canals.

Synopsis of Families.

I. *Axis jointed, calcareous; articulations spongy, swollen.*

1. Melithæadæ. Joints and articulations with tubular canals.

2. Mopsellad æ. Joints solid, reddish, articulations red, spongy; branches from the spongy articulations.

3. Trinellad æ. Joints solid, white, articulations spongy; branches from the solid joints.

II. *Axis jointed, calcareous; articulations narrow, horny, or cork-like.*

4. Mopseadæ. Branches from the cartilaginous articulations. Bark thick; cells conical.

5. Acanellad æ. Branches from the cartilaginous articulations. Bark and cells spinous.

6. Keratoisidæ. Branches from the stony joints. Bark and cells spinous.

7. Isidæ. Branches from the stony joints. Bark thick; cells minute, scattered over all the surface, sunken.

III. *Axis continuous, calcareous; the apex of the branchlets calcareous.*

8. Corallidæ.

IV. *The axis continuous, hard, corneo-calcareous; the apex of the branchlets often horny and flexible.*

a. *Bark granular, thin; polype-cells more or less prominent.*

9. Ellisellidæ.

b. *Bark formed of imbedded calcareous spicules; cells prominent, covered with spicules, and adpressed to the sides of the stem.*

10. Hypnogorgiadæ.

c. *Bark formed of scales; polype-cells prominent.*

11. Calligorgiadæ. Polype-cells tubular, in series on the sides or round the branches.

12. Calyptrophoradæ. Polype-cells peduncled, formed of two cones, in whorls round the stem.

13. Primnoadæ. Polype-cells peduncled or sessile, covered with scales, in whorls round the stem.

Section I. *Axis articulated, calcareous, stony; articulations swollen, spongy or cork-like; buds and branches from the swollen articulations.*

Fam. 6. MELITHÆADÆ.

Coral branched, on a plane; branches furcate, often anastomosing. Axis articulated, permeated by flexuous cylindrical canals, interrupted by harder swollen calcareous articulations; the joints and articulations at length solidifying into a continuous hard axis permeated by small tubular canals. Bark granular. Polypiferous cells small, in series on the *edge of the stem and branches.*

Melitæa, *Lamx. Polyp. Flex.* 1816, p. 461; *Lamk. Mém. Mus.* i. p. 410; *A. s. V.* ii. p. 270.
Melithæa, *Milne-Edw. Corall.* i. p. 199.
Melitea, *Warne, Corall.* p. 229.
Melitæadæ, *Gray, P. Z. S.* 1857, p. 284; *Ann. & Mag. Nat. Hist.* 1859, iv. p. 442.

Dr. Kölliker calls the canals in the axis "food-canals."

28. MELITHÆA.

Coral fan-like, expanded, forked; branches subparallel, often parallel and inosculating; buds and branches from the swollen articulations. Bark granular, rather thick. Cells small, not prominent, in two series on each side of the branches and branchlets, leaving the upper and lower surfaces bare or nearly so (see Esper, t. 21. f. 1, 2, 3). The axis of the branchlets rather solid, calcareous, of the lower joints pierced with numerous tortuous pores.

Melitæa, *Ehrenb.*
Melithæa, *Lamk. A. s. V.* ii. p. 279.
Isis, sp., *Pallas.*
Melitodes, *Verrill.*

The name *Melitæa* having been used for a genus of insects by Fabricius in 1808, four years before it was employed by Lamouroux, Mr. Verrill proposed *Melitodes* for the genus as restricted by Gray, P. Z. S. 1859, p. 485. (*Verrill, l. c.* p. 38.)

"The axis is jointed like that of *Isis*; but the horny matter is so small in quantity as only to suffice to hold together the numerous spicula of which the calcareous part of the axis is composed. These spicula are of a reddish colour in the more solid parts of the axis, those on the surface being larger and darker than those in the centre, as shown at B; but those on the joints are of a yellow colour and smaller, as shown at C."—*Quekett, Lectures, Histology*, ii. p. 127, f. 66.

70. Melithæa ochracea. B.M.

"Rather forked, very branchy, expanded, fan-like; joints swollen; branches and branchlets erect, flexuous, free."—*Lamk.*

The axis of the stem thick, calcareous, pierced with numerous very tortuous pores; the articulations prominent, spongy; they become obliterated with age, especially near the root.

Accabarium rubrum, *Rumph. Amb.* vi. p. 234, t. 85. f. 1.
Pseudocorallium croceum, *Rai. Hist. Plant.* i. p. 63.
Accabaar, *Seba, Thes.* iii. t. 101. f. 1.
Lithoxylum ramosum, *Linn. Hort. Cliff.* p. 480.
Corallium rubrum, *Ellis, Phil. Trans.* l. p. 188, t. 3.
Isis ochracea, *Linn. Syst. Nat.* ed. 10. p. 799; *Pallas, Zooph.* p. 230; *Solander & Ellis, Zooph.* p. 105; *Esper*, i. t. 4. f. 4*a*, 1–3, *Suppl.* t. 11. f. 1, 2; *Gmelin, S. N.* p. 3793.
Melitæa ochracea, *Lamx. Polyp. Flex.* p. 462; *Deslong. Enc. Méth.* p. 512; *Lamk. Mém. Mus.* i. p. 413; *A. s. V.* ii. p. 279; *Meyen, Nov. Act. Leop.* xvi. t. 29; *Ehrenb. Corall.* p. 131; *Meyen, Nov. Act. Nat. Cur.* xvi. p. 168, t. 29; *Gray, P. Z. S.* 1857, p. 285, 1859, p. 485; *Dana, Exp.* p. 682; *Kölliker, Ic. Hist.* p. 142, t. 19. f. 37, 40, 43.
Melitea ochracea, *Warne, Corall.* p. 230.
Melithæa ochracea, *Milne-Edw. Corall.* i. p. 199.
Melitodes ochracea, *Verrill, Bull. Mus. Comp. Zool.* p. 38.

Coral orange-red; cells rather produced, bright cinnabar-red, rather far apart.

α. Coral bright yellow, with purplish-red cells; cells in two or three rows, chiefly confined to the sides of the branchlets.

β. Coral dark red, with yellow cells; cells small, in two rows, almost entirely confined to the sides of the branchlets; in some specimens the cells are not so distinctly marked and bright-coloured as in others.

The interarticular pieces of the branches vary in surface: in some specimens they are nearly smooth, in other specimens they are deeply and irregularly longitudinally channelled.

Lamarck describes three varieties:—

a. Purple, ramuli very numerous.

b. Whitish yellow, ramuli less numerous.

c. Yellow, with series of purple cells on the sides of the branchlets.

71. Melithæa virgata.

Coral expanded; principal branches nearly parallel, much elongated tapering, and subdividing far less rapidly than in *M. ochracea*; the calcareous segments of the axis elongate.

Melithæa ochracea (part.), *Dana*, from Fejee Islands.
Melitodes virgata, *Verrill*, *Bull. Mus. Comp. Zool.* p. 38.

Hab. Feejee Islands.

Fam. 7. MOPSELLADÆ.

Coral branched, on a plane; branches from the articulations, forked, often parallel and anastomosing. Axis calcareous, solid, hard, semitransparent, pink, longitudinally striated. The internodes swollen, spongy or cork-like, red. Bark moderately thick, granular, spiculose. Polype-cells somewhat prominent, in one or more series on the edges of the branches.

Synopsis of Genera.

I. *Coral fan-shaped.*

1. Melitella. Polype-cells long, in several rows.
2. Acabaria. Polype-cells broad, short, in one row.
3. Anicella. Polype-cells small, prominent, in one row.

II. *Coral shrub-like, forked.*

4. Mopsella. Coral shrub-like, dichotomous.
5. Clathraria. Coral shrub-like, dichotomous, inosculating.

I. *Coral fan-shaped.*

29. MELITELLA.

Coral fan-like, expanded, forked; branchlets generally inosculating, often divaricated. Cells rather convex, numerous, in several series on the sides and upper surface of the branches and branchlets, leaving a slender impressed line destitute of cells on one (the lower)

surface of the branches. The axis solid, calcareous, not becoming spongy, longitudinally grooved. Buds and branches from the swollen joints. Bark hard, smooth. Polype-cells convex, with a thick, rounded, raised edge and sunken centre.

Melithæa, sp., *Milne-Edw. & Haime, Corall.* i. p. 200.
Melitodes, sp., *Verrill, Bull. Mus. Comp. Zool.* 1864, p. 38.

* *Branches virgate, subparallel, inosculating.*

72. Melitella elongata. B.M.

Coral fan-shaped; joints cylindrical, elongate; internodes swollen; orange; branches virgate, subparallel, much divided; branchlets slender, compressed, sometimes inosculating; joints of the branchlets very long, slender, compressed.

? Isis ochracea (ramorum summitates), *Esper, Pflanz.* t. 4 A. f. 2, 4, 5 (not 3).
Melitella elongata, *Gray, P. Z. S.* 1859, p. 485; *Verrill, Bull. Mus. Comp. Zool.* p. 38.

Hab. Singapore.

This species is very like *Melitæa ochracea*, but the cells are much more numerous and crowded, and the axis is solid and calcareous.

Esper's figures somewhat represent this species; but the cells are not sufficiently crowded and numerous in figs. 4 & 5.

The lateral groove is distinctly marked on the outer side, and more or less indistinctly so on the uppersides of the branches and branchlets.

73. Melitella flabellata. B.M.

Coral fan-shaped, ovate, longer than broad; joints slender, in the middle thicker.

Hab. ——?

74. Melitella atrorubens. B.M.

Coral much branched, dichotomous, fan-like; branches radial; branchlets cylindrical. Bark dark, uniform deep brown red. Polype-cells on the upperside and edges of the branchlets, with a hard, slightly raised, circular margin.

Melitea ochracea (part.), *Lamx. MSS.*

Hab. India. From M. Lamouroux's Collection.

75. Melitella linearis. B.M.

Coral very much branched, on a plane; branchlets very slender, filiform, of a uniform size, coalescing at each joint, leaving oblong, elongate interspaces; articulations large, swollen, red. Axis white. Cells rather prominent, very few, rather far apart, one or two series on each side of the stem?

Hab. ——? A fragment only.

Coral fan-shaped, white; branches parallel, linear, very slender,

thread-like, regularly anastomosing; joints elongate; internodes swollen; the bark with many imbedded spicules; cells scattered.

** *Branches divaricated, reticulately inosculating.*

76. Melitella retifera. B.M.

Stem thick; branches nodose at the joints, flat, ramulose; branchlets divaricated, flexuous, rather reticulated, and very closely warty, frequently anastomosed, articulations remote or deficient on the twigs, very apparent on the branches, and close together on the stem. Bark purple, or yellow with purple spots, or orange. Polype-cells large, conical.

Isis aurantia, *Esper, Suppl.* ii. t. 9.
Isis coccinea, *Esper, Suppl.* ii. t. 10.
Melitæa retifera, *Lamk. Mém.* i. p. 412, *Hist.* ed. 2. ii. p. 473; *Lamx. Polyp. Flex.* p. 463; *Ehrenb. Corall.* p. 131; *Gray, P. Z. S.* 1857, p. 284, 1859, p. 486; *Dana, Exp.* p. 683; *Kölliker, Ic. Hist.* p. 142, t. 19. f. 38, 39.
Mopsella aurantia, *Verrill, Mus. Comp. Zool.* p. 38.
Melitea retifera, *Warne, Corallina,* p. 231.
Melithæa retifera, *Milne-Edw. Corall.* i. p. 200.

Hab. Indian Ocean; Australia (*Garret*).

77. Melitella textiformis. B.M.

"Stem short, knotty, dividing considerably into very slender, warty, anastomosing twigs, leaving lengthened meshes."—*Lamx.*

Melitæa textiformis, *Lamk. Mém. Mus.* i. p. 412; *Lamx. Polyp. Flex.* p. 465, t. 19. f. 1; *Ehrenb. Corall.* p. 131; *Gray, P. Z. S.* 1857, p. 285.
Melithæa textiformis, *Milne-Edw. Corall.* i. p. 201.
Melitea textiformis, *Warne, Corallina,* p. 231, t. 19. f. 1.
Melitea retifera, var. ?, *Dana, Zooph.* p. 683.
Mopsella textiformis, *Verrill, Bull. Mus. Comp. Zool.* p. 38.

Hab. South Seas.

78. Melitella coccinea. B.M.

Small, variously branched; branches very slender, tortuous, divaricated; branches diverging and anastomosed together; articulations obsolete, contorted; cells scattered, conical.

Isis coccinea, *Ellis & Solander, Zooph.* p. 107, t. 12. f. 5; *Gmel. S. N.* p. 3794; *Esper,* i. t. 3A. f. 5 (cop. *Ellis*).
Melitæa coccinea, *Lamk. Mém. Mus.* i. p. 413, *Hist.* ii. n. 4; *Ehrenb. Corall.* p. 131; *Kölliker, Ic. Hist.* p. 142, t. 15. f. 9, t. 16. f. 1, 2; *Dana, Exp.* p. 683; *Gray, P. Z. S.* 1857, p. 284, 1859, p. 486.
Melitæa Rissoi, *Lamx. Polyp. Flex.* p. 463; *Expos. Méthod. Polyp.* p. 38, t. 12. f. 5 (from *Ellis*).
Melitea Rissoi, *Warne, Corallina,* p. 231.
Melithæa coccinea, *Milne-Edw. Corall.* i. p. 200.

Hab. India; New Holland.

"Varies yellow, buff, rose-red, and scarlet colours."—*Dana.*

79. Melitella japonica.

Coral low, spreading, dichotomous, branching, nearly on a plane;

branches slender, diverging at an angle of about 45°, obtuse at the ends. Cells rounded, papilliform, rather large, crowded. Colour of all observed vermilion red, with yellow polypes.

Mopsella japonica, *Verrill, Proc. Essex Inst.* 1865.

Hab. Japan (*Sameda*).

Nearly allied to *M. coccinea* (*Isis coccinea*, Ellis & Solander); but the branchlets do not coalesce, as in those species, and spread much less abruptly. The cells also are considerably larger.

30. ACABARIA.

The coral very slender, branched, dichotomous, expanded in a plane; branches and branchlets very slender, compressed; with short, swollen internodes, more prominent on the older stems. Bark thin, hard, smooth. Cells short, broad, subcylindrical, truncated, in a single series on each edge of the branches and branchlets, rather close together. Axis calcareous, solid, red, longitudinally grooved; internodes short, swollen, spongy.

Acabaria, *Gray, P. Z. S.* 1859, p. 484; *Ann. & Mag. Nat. Hist.* 1868, ii. p. 444.

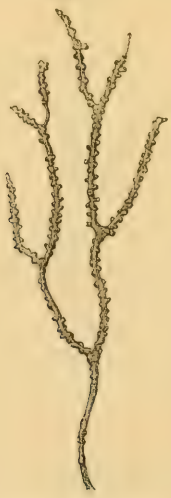
80. Acabaria divaricata. B.M.

Coral tree-like. Bark ——? Axis very slender, thread-like (not $\frac{1}{2}$ line thick); joints elongate, smooth, pale red. Articulations only *slightly swollen*, spongy; the branches divaricating, rather rounded at origin.

Acabaria divaricata, *Gray, P. Z. S.* 1859, p. 484; *Ann. & Mag. Nat. Hist.* 1868, ii. p. 445, f. 3.

Hab. Australia (*Jukes*, no. 2787).

Fig. 1.



Acabaria divaricata.

31. ANICELLA.

Coral fan-like, dichotomously branched; branches separate, divaricating in the same plane, arising from the short rather sunken joints. Bark thin, hard, smooth, longitudinally grooved. Cells minute, subcylindrical, short, produced in a narrow alternating series on each edge of the branches and branchlets. Axis calcareous, solid, with longitudinal grooves; internodes very short, contracted, cork-like.

Anicella, *Gray, Ann. & Mag. Nat. Hist.* 1868, ii. p. 445.

Hab. ——?

Like *Melithœa*, but the polype-cells small, prominent, and in a single lateral series.

It agrees with *Mopsea* in the joints being short and contracted; but they are cork-like, as in the younger branches of *Melitella*, and horny.

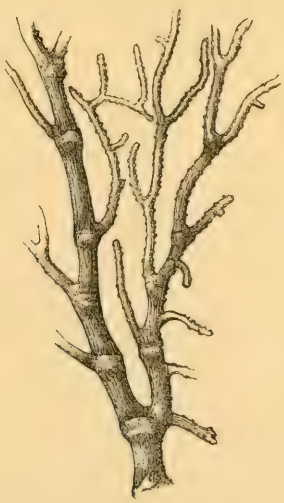
81. **Anicella australis.** B.M.

Coral red, growing in one plane; the stem distinctly jointed; the branchlets slender, with the joints very inconspicuous.

Anicella australis, *Gray, Ann. & Mag. Nat. Hist.* 1868, ii. p. 445, f. 4.

Hab. Port Essington (*Jukes*).

Fig. 2.



Anicella australis.

II. *Coral erect, shrub-like, forked.*

32. MOPSELLA.

Coral tree-like, dichotomously branched; branches diverging from the swollen spongy joints. Axis articulated; segments elongated,

stony, with short swollen hard and porous joints. Base of the axis expanded, discoid, *not* stellate, lobed. Bark permanent, granular, with scattered spicula. Cells prominent on all sides of the branchlets, and scattered on the branches.

Mopsella, *Gray, P. Z. S.* 1857, p. 284, 1859, p. 486.

"I am unable to find any generic difference between *M. dichotoma*, which is the type of *Mopsella*, Gray, and those subsequently referred by him to the genus *Melitella*; and I have, therefore, united the two genera."—*Verrill.*

82. Mopsella dichotoma. B.M.

Coral branched, dichotomous, filiform, diffused, smooth, striated; internodes short, swollen, reddish.

Hippuris coralloides cornea, *Petiver, Gaz.* t. 3. f. 10 (with bark).
Isis dichotoma, *Linn. Syst. Nat.* ed. 10, p. 799; *Gmel. S. N.* p. 3793; *Pallas, Zooph.* p. 229; *Esper*, i. t. 5, t. 11. f. 4, 5; *Lamk. Hist.* ed. 2. ii. p. 475, n. 3, *Mém. Mus.* i. p. 418; *Herm. Naturf.* xv. p. 135, t. 5. f. 1 (barked); *Schweigger, Beob.* no. 10, *Handb.* p. 434.
Mopsea dichotoma, *Lamx. Polyp. Flex.* 1816, p. 466; *Dana, Exp.* p. 678 (not *Seba*, t. 106. f. 4); *Milne-Edw. & Haime, Corall.* i. p. 197; *Kölliker, Ic. Hist.* p. 142, t. 15. f. 8–10, t. 19. f. 25.
Mopsella dichotoma, *Gray, P. Z. S.* 1857, p. 284, 1859, p. 486; *Ehrenb. Corall.* p. 131; *Verrill, Bull. Mus. Comp. Zool.* p. 38.

"Polype-cells mamilliform on the upper, tuberculose on the middle, and superficial on the lower branches."—*Lamk., Lamx. l. c.* p. 468.

Hab. Cape of Good Hope. With uniform yellow bark (apices deficient).

83. Mopsella erythracea.

Shrub-like, forked; warts scattered. Axis reddish; joints *roundish, longitudinally grooved*; *knots slightly tumid.*

Isis erythrus, *Milne-Edw. in Lamk. Hist.* ed. 2. ii. p. 477.
Mopsea erythræa, *Ehrenb. Corall.* p. 131; *Dana, Exp.* p. 679; *Milne-Edw. & Haime, Corall.* i. p. 198.
Mopsea erythracea, *Kölliker, Ic. Hist.* p. 142, t. 19. f. 43, 44, t. 16. f. 7.

Hab. Red Sea.

"Very like *I. gracilis*, but branches much more slender. Bark red; polypes white."—*Milne-Edwards, l. c.*

84. Mopsella tenella.

Fruticose, 3 inches high, deep scarlet, much branched; branches and branchlets very slender, in no part a line thick, flexuous; joints 3 to 8 lines long; cortex verrucose; verrucæ small ($\frac{1}{2}$ line broad), not at all ascending. Polypes bright yellow. Axis calcareous, nearly smooth.

Melitæa? tenella, *Dana, Exp.* p. 683.
Melitella? tenella, *Gray, P. Z. S.* 1859, p. 486.
Melithæa tenella, *Milne-Edw. Corall.* i. p. 201.
Mopsella tenella, *Verrill, Bull. Mus. Comp. Zool.* p. 39.

Hab. Sandwich Islands.

"More slender than any of the preceding; branches not on a plane, and rarely coalescing. Axis pale red."—*Dana.*

85. Mopsella gracilis. B.M.

Coral very slender, thread-like; joints elongate, slender, pale red; articulations only slightly swollen; branches divaricating, the *first* rather rounded at the base.

Mopsella gracilis, *Gray, P. Z. S.* 1859, p. 486.

Hab. ——?

33. CLATHRARIA.

Coral shrub-like; branches cylindrical, erect, tortuous, interosculating, of nearly *equal thickness*; branchlets, some free, blunt. Bark thin, granular. *Cells small, immersed, nearly equally scattered on all sides of the branches*; buds and branches from the swollen joints; joints elongate, white, longitudinally striated; internodes red, spongy.

Clathraria, *Gray, P. Z. S.* 1859, p. 486.

86. Clathraria rubrinodis. B.M.

Coral-branches cylindrical, nearly of equal thickness.

Clathraria rubrinodis, *Gray, P. Z. S.* 1859, p. 486.
Mopsea bicolor, *Köll. Icones Hist.* p. 142, t. 19. f. 42.

Hab. ——?

Fig. 3.



Clathraria rubrinodis.

87. **Clathraria acuta.** B.M.

Coral-branches tapering; branchlets acute.

Hab. ——?

Fam. 8. TRINELLADÆ.

Coral much branched, expanded, fan-like, on a plane. Bark thin, with a very large number of small slender spicules. Bark and polypes with rough minute diverging spicules. Polype-cells on all sides of the branchlets, and scattered over the branches; prominent, broad, and depressed or elongate, and cylindrical. Axis calcareous. Joints hard, solid, longitudinally striated, with indistinct, slightly contracted articulations, which are cork-like and pierced with a number of tubular canals when deposited, but are soon covered with a white, hard, solid coat like the joints; branches from the short stony joints.

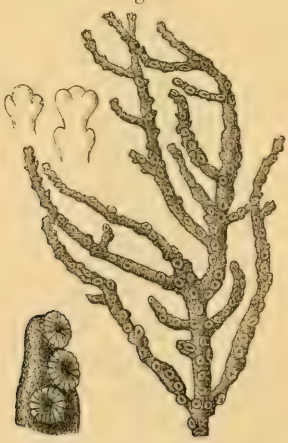
34. TRINELLA.

Coral branched, fan-like; branches furcate; branchlets subpinnate, diverging; terminal branchlets with a series of conical projections on each of the two edges, the last joint compressed, three-lobed. The bark thin. Polype-cells on the terminal branchlets in two lateral series, alternating with the central marginal projections, scattered on the branches and main stem. Cells circular; margin slightly raised, covered with radiating spicules and a central depression. Axis white, solid, hard, calcareous, with very indistinctly marked, slightly contracted, short internodes; internodes hard, with small tubular canals.

88. **Trinella Swinhoei.** B.M.

Hab. Formosa (*Swinhoe*).

Fig. 4.



Trinella Swinhoei.

35. PARISIS.

"Coral irregularly branching, nearly on a plane. The axis consists alternately of calcareous and suberous segments, of uniform thickness, traversed by numerous narrow sulcations. The branches originate from the *calcareous* segments. Cœnenchyma [bark] persistent, rather thin, somewhat membranous, with a rough surface. *Cells cylindrical, narrow, prominent, arranged irregularly on all sides of the branchlets*, but often absent on the median surfaces of the larger branches."—*Verrill.*

Parisis, *Verrill, Bull. Mus. Comp. Zool.* 1865, p. 36, *Proc. Essex Inst.* 1865.

89. Parisis fruticosa. B.M.

Large, flabelliform; the principal branches, arising irregularly along the sides of the trunk, divide and subdivide rapidly into smaller branches and branchlets, producing a densely ramulose frond; the branches ascend and diverge usually at an angle of about 50°; the branchlets often spread at right angles, and do not coalesce. Papillæ numerous, crowded on the branchlets, conical. Colour greyish yellow. Axis white; internodes yellowish brown.

Parisis fruticosa, *Verrill, Bull. Mus. Comp. Zool.* p. 38.

Hab. Sooloo Sea (*Dana*).

90. Parisis laxa.

Coral forming openly *reticulate* fronds; papillæ numerous, rounded on all sides of the branches; cœnenchyma minutely villous in alcohol. Calcareous joints shorter and internodes longer, than in *P. fruticosa*, Verrill.

Parisis laxa, *Verrill, Proc. Essex Inst.* 1865, v. pp. 152, 190.

Hab. Hong-Kong (*W. Stimpson*).

Coral flabelliform, loosely branched, openly reticulated, only a few of the branches coalescent; branchlets spreading nearly at right angles, somewhat elongated, curved, obtuse at the ends. Papillæ rather large, irregularly crowded. Cœnenchyma thin, roughened by the points of the minute spicules. Axis slender, consisting of white calcareous joints, alternating with shorter dark-brown ones of the same thickness, but softer. Colour, in alcohol, light grey. Height 3 inches, width 3 inches, diameter of branches $\frac{1}{5}$ inch. Colour, in life, bright light blue.

Section II. *Axis articulated, stony, solid; articulations short, contracted, horny or cartilaginous, branches from the horny joints.*

Fam. 9. MOPSEADÆ.

Coral branched, expanded in a plane; branches dichotomous, free; branchlets dichotomous or pinnate. Bark thin, smooth, spongy. Polype-cells prominent, small, cylindrical, in series or whorls on each

edge of the branches. Axis articulated, calcareous, solid, expanded at the base; articulations contracted, short, cork-like or cartilaginous. Branches from the contracted horny articulations.

* *Coral dichotomous; polype-cells on the edge of the branches.*

36. ISIDELLA.

Coral branched, furcate. Axis smooth, cylindrical; stony joints elongate; branches furcate, proceeding from the *corneous* joints. Bark rather thick, with irregular opaque spicula. Polypiferous cells produced, subcylindrical. Base of axis expanded, lobed, and branched.

Isidella, *Gray, P. Z. S.* 1857, p. 283.
Isis (in part), *Milne-Edw. & Haime, Corall.* i. p. 193.

91. Isidella elongata. B.M.

Branches very few and frequently anastomosed, round, elongate; joints elongate, deeply grooved; internodes narrow. Bark unknown.

Frutex marinus &c., *Seba, Thes.* iii. t. 106. f. 4.
Isis elongata, *Esper*, i. t. 6; *Lamk. Mém.* ed. 2, p. 475; *Milne-Edw. Corall.* i. p. 196.
Isidella elongata, *Gray, P. Z. S.* 1857, p. 283.
Mopsea elongata, *Philippi, Wiegm. Arch.* 1842, p. 38.
Mopsea mediterranea, *Risso, Eur. Merid.* p. 322, f. 1.

Hab. Mediterranean; Naples.

Polypes long, exsert, and not retractile, forming a slender wart; closed polypes mostly reversed (*fide* Risso's fig.).

The branches of *I. elongata* are said to be often anastomosed, and for this reason it appears to be separated from *I. gracilis*; but I have never seen them in that state (Lamx. Pol. Flex. p. 477).

92. Isidella gracilis.

Base expanded, laminated; stem and branches cylindrical; branches few; joint of axis rather thick; of upper part elongate, translucent, smooth, white; articulation swollen.

Isis gracilis, *Lamx. Polyp. Flex.* p. 477, t. 18. f. 1, *Enc. Méth.* p. 466; *Kölliker, Ic. Hist.* p. 140, t. 15. f. 3; *Milne-Edw. in Lamk. Hist. A. s. V.* ed. 2, ii. p. 476.
Mopsea gracilis, *Dana, Exp.* p. 679; *Milne-Edw. & Haime, Corall.* i. p. 198.

Hab. West Indies.

Milne-Edwards places this as a *Mopsea*, and *Isis elongata* as an *Isis*, though it is figured by Esper as with the branches arising from the cartilaginous joints.

93. Isidella coralloides.

Branches forked, reddish, very slender; branchlets remote, rather short. Bark with scattered *ascending papillæ*. The calcareous joints

very short, broader than long, and shorter than the horny internodes; internodes cylindrical, contracted in the middle, rose-red.

Isis coralloides, *Lamk. Mém. Mus.* i. p. 416, *Hist. A. s. V.* ed. 2. ii. p. 476; *Milne-Edw. Corall.* i. p. 195.
Mopsea?, *Dana, Exp.* p. 680.
Isidella? coralloides, *Gray, P. Z. S.* 1857, p. 284.

Hab. South Sea.

94. Isidella eburnea.

Arborescent, slender, dichotomous. Calcareous joints long, cylindrical, faintly striated, seldom quite straight, not swollen at the ends. Corneous joints very short. (In one case a long straggling branch, entirely corneous, has grown from a calcareous joint, and bears four polypes.) Polypes scattered, bright orange, generally arising from the calcareous joints, but also occasionally from the corneous ones, surrounded by a spirally twisted bundle of long spicules, of which eight longer ones project around the tentacles. The latter are pinnate, and strengthened in their whole length by a chain of blunt cylindrical spicules. The colour of the whole corallum, with the exception of the corneous joints and the polypes, is pure white.

Mopsea eburnea, *Pourtales, Bull. Mus. Comp. Zool.* 1868, p. 133.

Hab. A fine specimen, 4 inches high, was obtained, in 517 fathoms, off Sombrero Light, Florida. The diameter of the thickest part is $\frac{1}{16}$ of an inch. The root was not brought up.

** *Coral pinnate; cells whorled.*

37. MOPSEA.

Coral branched, fan-shaped; branches pinnate. Axis jointed; stony joint short; branches from the short horny articulation. Bark hard, with imbedded spicula. Polypiferous cells produced, wart-like, subverticillate, ascending, rather incurved.

Mopsea, *Lamx. Polyp. Flex.* 1816, p. 466, *Corallina*, p. 233.
Isis, sp., *Lamk. Hist. A. s. V.* ed. 2. ii. p. 474.
Mopsea, B B, *Milne-Edw. & Haime, Corall.* i. p. 197; *Dana, Exp.* p. 678; *Gray, P. Z. S.* 1857, p. 284.
Isis, **Mopsea, *Schweigger, Beob.* 1819, t. 10.

The bark is much thinner than that of *Isis hippuris*. The cells are very like those of *Gorgonia verticillaris*; but they are more scattered on the stem.

95. Mopsea encrinula. B.M.

Coral branched; branches pinnate or subbipinnate; branchlets filiform, papilliferous; papilla spread, ascending.

Isis encrinula, *Lamk. Hist.* ii. p. 302, and, ed. 2, ii. p. 476.
Mopsea verticillata, *Lamx. Polyp. Flex.* p. 467, t. 18. f. 2.
Isis (Mopsea) verticillata, *Schweigger, Beob. Syn.* 1819, f. 10.
Isis dichotoma, *Schweigger, Handb.* p. 434.

Mopsea encrinula, *Ehrenb. C. r. M.* p. 131; *Dana, Exp.* p. 679; *Gray, P. Z. S.* 1857, p. 284.
Mopsea encrinula, *Milne-Edw. Corall.* i. p. 198.

Hab. Australia?

Fam. 10. ACANELLADÆ.

Coral bushy, ovate, like a fox's tail. Stem simple, with long stony, and shorter cartilaginous joints, and with verticillate, simple or branched branches, from the horny internodes. The bark very thin, with elongate, fusiform, semitransparent, smooth spicules. Polype-cells scattered, narrow at the base, wider at the mouth, and covered with lanceolate, elongate, smooth, fusiform spines, eight of which are produced beyond the edge of the cell.

38. ACANELLA.

Coral shrub-like, branched, dichotomous; stony joints elongate, cylindrical, finely longitudinally striated; branches from the cartilaginous joints, verticillate; branchlets very numerous, branched, diverging, tortuous, forming an oblong tuft, like a fox's tail; interjoints very short, cartilaginous, contracted. Bark thin, skin-like, containing long large fusiform and small cylindrical, very tuberculated spicules. Polype-cells on the sides of the branchlets sessile, of the apex of the joints funnel-shaped, twisted, with eight long, erect, spine-like spicules.

96. Acanella arbuscula. B.M.

Mopsea arbusculum, *Johnson, Ann. & Mag. Nat. Hist.* 3rd ser. xi. p. 299; *Proc. Zool. Soc.* 1862, p. 245, pl. xxxi. f. 1, 1 *a*.

Hab. Madeira.

"The whole coral is coated with a thin brown skin. When this skin has been removed from the lower calcareous joints, they are found to be stony, white, subcylindrical, but rather narrower at the middle than at either end. They are finely striate longitudinally, and the striæ are parallel and straight. The interjoints do not nearly equal the joints in length, being little more than disks, and are somewhat less in diameter; they are striate; and from them spring the branches. These branches are very numerous, diverging in all directions subdichotomously, and making a tolerably thick bush. They are much thinner than the main stem, and they become gradually more slender upwards, the calcareous joints at the same time becoming longer. Occasionally two of the ultimate branchlets come into contact and are soldered together. Each branchlet bears

at its apex a cell of a shape between campanulate and infundibuliform, the margin of which bears eight pairs of long, upright, spine-like spicula. There are also sessile cells at the sides of the ultimate branchlets, one at each interjoint. All the cells are of a pale brown colour. The pellicle covering the branchlets contains long spicula,

Fig. 5.



Acanella arbuscula.

which are for the most part large and fusiform, whilst the smaller ones are cylindrical, and all are brown and minutely tuberculated.

"A single example of this coral was obtained from a fisherman at Cama de Lobos, Madeira, and it is now in the British Museum. Its length, without the base, which is wanting, is 13 inches, and it is

7 inches across. The lower part of the main stem has a diameter of three tenths of an inch in length. The branches are broken away from this part of the stem; but there are remains to show that some of the interjoints bore four branches, others only one. A cell, with its marginal spines, measures the fifth of an inch."—*Johnson, l. c.*

39. EQUISETELLA.

Coral erect, with whorls(?) of elongated, simple, jointed branches. Bark and polype-cells unknown.

97. Equisetella Gregorii. B.M.

Stem thick, erect(?); branches verticillate(?), very long, slender, filiform, with elongate, slender, smooth joints; horny articulations short.

Isis Gregorii, *Gray, Ann. & Mag. Nat. Hist.* 1868, ii. p. 263.

Hab. Japan.

The branch in the British Museum is 26 inches long.

Fam. 11. KERATOISIDÆ.

Coral branched, tree-like, dichotomous; branches cylindrical. Bark thick, formed of abundant, longitudinally placed, elongate fusiform spicules. Polype-cells subcylindrical, wider at top, covered with spicules, and with eight or ten long spicules on the edge. Polypes retractile. The axis, calcareous joints long, smooth, the cartilaginous short.

40. KERATOISIS.

"Polypidom branched; axis of the stem and branches consisting of nodes and internodes, the former stony, the latter horny; the stony joints vary from $\frac{1}{2}$ to 1 inch in length; the branches rise from the stony nodes, are not numerous, and present rather a straggling appearance. The axis is covered with a barky layer, around which the polypes arise; this layer is studded over with numerous large fusiform spicules, which completely cover the ectodermic layer of the polypes. Eight or ten large spicules (about $\frac{1}{8}$ inch each in length) form a circle around each polype; these spicules are fusiform. Colour, when fresh, a light pink."

Keratoisis, *Perceval Wright, in Ann. & Mag. Nat. Hist.* 1868, ii. p. 427, 1869, iii. p. 24.

The spicules of the bark not warty but smooth, those surrounding the cells upon the polypes of great length.

98. **Keratoisis Grayii.** B.M.

Keratoisis Grayii, *Perceval Wright, in Ann. & Mag. Nat. Hist.* 1868, ii. p. 427, 1869, iii. p. 24, fig.

Fig. 6.



Fig. 7.



Fig. 8.



Fig. 6 represents a portion of the main axis, deprived of cœnenchyma and of nearly all its polypes.
Fig. 7 represents a branch, of the natural size, with the polypes.
Fig. 8. A polype magnified.

Hab. Lisbon (*Bocage*). From a depth of about 400 fathoms, off the coast near Setubal in Portugal.

Fam 12. ISIDÆ.

Coral branched, tree-like or fan-shaped; branches from the stony joints. Axis hard, articulated, composed of alternating portions of hard calcareous and flexible horny black or brown matter. Bark granular, with irregular-shaped calcareous spicules, smooth, external. Polype-cells very small, scattered over the whole surface of the bark.

Isidinæ, *Kölliker, Ic. Hist.* p. 140.

Isinæ, *Dana, Expl. Exped. Zooph.* 1846, p. 677 : *Milne-Edw. Brit. Foss. Corall.* p. 81.
Isidea, *Ehrenb. C. r. M.* p. 133.
Isideæ, *Lamx. Polyp. Flex.* p. 458, *Corall.* p. 229 ; *Gray, P. Z. S.* 1857, p. 283 ; *Gray, Ann. & Mag. Nat. Hist.* 1859, iv. p. 442.

41. ISIS.

Coral branched, furcate. Axis striated ; branches proceeding from the calcareous articulations. Bark thick, hard, with a few interspersed, very irregular and unequal spicula. Polypiferous cells very small, sunken, scattered over the whole surface (Esper, t. 3 *a*). Base of coral expanded, tuberous.

Isis, *Linn. S. N.* p. 1287; *Pallas, Zooph.* p. 220; *Solander & Ellis*, p. 101; *Lamk. Syst. A. s. V.* p. 378; *Lamx. Polyp. Flex.* p. 468; *Milne-Edw. & Haime, Corall.* i. p. 193; *Gray, P. Z. S.* 1857, p. 283; *Kölliker, Ic. Hist.* p. 140.
Cymosaire, *Lamk. Mém. Mus.* i. p. 467.
Hippurium, *Oken, Lehrb.* 1815, t. 2.

The bark is very thick, with a few interspersed, very irregular, and unequal spicules, and when dry is rather brittle, but is as permanent as that of a *Gorgonia*. It is figured by Solander, Zooph. t. 3. Ellis has justly observed that the sailors generally take it off during the passage to this country to show the black joints. Lamarck, misled by this circumstance, never having seen the back, describes it as "*caduce en totalité*," p. 300 ; he thought that it was gelatinous. It is very apt to fall off if the specimens are kept in a dry place (see form of spicula or bark &c., Quekett, Lectures on Histology, ii. p. 125, f. 64, and Kölliker, *l. c.* t. xvi. f. 4, t. xix. f. 1, 2, 3.

The articulations between the joints generally become obliterated near the base of the coral of the older specimens, either by the contraction and solidification of the horny part, or by the horny portions becoming covered with a calcareous deposit.

G. Humphrey, in the Portland Museum (lot 3490), observed a fine specimen of the base or root of the *Isis hippuris*, which is white, not jointed, with the black woody parts, as in the stem and branched part that was next the body, quite flat. He adds it is not figured by any author, and is extremely rare. Lamarck, not aware of this fact, established for the root of a specimen which had the joint so obliterated the genus *Cymosaire* ; but he soon discovered his error and corrected it, with his usual honesty and straightforwardness.

" Le genre Cymosaire (Mém. du Mus. vol. i. p. 467) doit être supprimé. Je le fondoit par erreur sur la vue d'une portion d'axe à nu d'une Isis, dont la base offre un empalement rameux et en cyme ombelliforme."—*Lamk. A. s. V.* ii. p. 393 ; see *Seba*, iii. t. 105. f. 3.

Professor Steenstrup has divided the genus into several species, according to the form and length of the stony joints. I have not been able to decide if they are species or only accidental varieties. The coral is very variable from the same locality.

I. hippuris. The stony joints elongate, cylindrical, or narrow in the middle, two or three times as long as thick. Amboina.

I. polyacantha. Stony joints subcylindrical, rather elongate, of unequal length, truncated at the end; the branchlets spine-like. America.

I. moniliformis (Kölliker, Ic. Hist. p. 140). Stony joints very short, swollen in the middle, forming a bead-like stem (Esper, t. 2; Seba, iii. t. 110. f. 2). India. B.M.

I. coralloides (Lamk.). Stony joints very short, shorter than the horny joints, rose-coloured; branches very slender. Pacific Ocean. This I have not seen.

Var. *cymosaria.* The branches forming a cyme.

Cymosaire, *Lamk. Mém. Mus.* i. p. 467.
Isis hippuris, var., *Lamk. Hist. A. s. V.* ii. p. 303.

99. Isis hippuris. B.M.

Slightly branched; bark smooth, thick, osculiferous; joints of axis grooved, irregular, upper compressed; joints of the branches longer than those of the branchlets.

Corallium articulatum, *Imperat. Ital.* p. 628; *Aldrov. Mus. Metal.* p. 289; *Loch. Mus. Besler.* t. 23.
Hippuris saxea, *Clus. Exot.* p. 124; *Olear. Mus.* p. 69, t. 35. f. 4; *Valent. Ind. Lit.* p. 504, t. 8. f. 2, 3, 4.
Pseudocorallium croceum, *Boccone, Obs. Gall.* p. 34, t.
Accabaarium album, *Rumph. Amb.* p. 6, t. 84; *Valent. Ind.* iii. t. 52. f. A.
Lithophyton articulatum, *Gualt. Ind.* t. 7; *Seba, Thes.* iii. t. 105. f. 3, t. 110. f. 1, 2; *Knorr, Delic.* t. A 1. f. 5.
Sertularia ramosissima, *Linn. Hort. Cliff.* p. 480.
Isis hippuris, *Linn. S. N.* ed. 12, t. 287; *Pallas, Zooph.* p. 233; *Esper*, i. t. 1, 2, 3, 3 *a*; *Solander & Ellis, Zooph.* p. 105, t. 3. f. 1–5 (with bark); *Lamk. Syst. A. s. V.* p. 378; *Gray, P. Z. S.* 1857, p. 283; *Kölliker, Ic. Hist.* p. 140, t. 19. f. 42, 43, t. 16. f. 4.

100. Isis flexibilis.

Irregularly branching, subflabellate; branches very long and slender; calcareous joints cylindrical, nearly smooth, or with a few faint striæ, about four times as long as the corneous ones in the thicker branches, but proportionally much longer in the branchlets. Polypes rather thickly set, generally alternate, short, campanulate, armed with short spines. The thickest stems about $\frac{1}{16}$ inch in diameter, the branchlets not much thicker than horse-hair. The main stems were not obtained. Colour dark brown, from a thin cœnenchyma covering the younger branches.

Isis flexibilis, *Pourtales, Bull. Mus. Comp. Zool.* 1868, p. 132.

Obs. In a few instances the branches appear to arise from the *corneous joints.*

Hab. In 324 fathoms, off the Florida Reef.

Section III. *Axis calcareous, solid, not jointed, uniformly calcareous to the apex of the branchlets.*

Fam. 13. CORALLIDÆ.

Axis inarticulate, solid, calcareous, more or less hard and stony. Bark smooth, granular, with irregular-shaped calcareous spicula. Polypiferous cells simple, more or less exserted.

The chemical character of the axis may be easily discovered by a small quantity of muriatic acid.

Corallinæ, *Dana, Expl. Exped.* 1846, p. 639; *Milne-Edw. Corall.* i. p. 201.
Coralliinæ, *Dana, Exp.* p. 639.
Isis, sp., *Linn. S. N.* p.
Gorgonieæ (part.), *Lamx. Polyp. Flex.* p. 363.
Corallidæ, *Gray, P. Z. S.* 1857, p. 286; *Ann. & Mag. Nat. Hist.* 1859, iv. p. 441; *P. Z. S.* 1859, p. 480.

42. CORALLIUM.

Coral tree-like, branched, forked. Axis hard, continuous, stony, striated externally. Bark granular, without any lateral grooves, when dry formed almost entirely of irregular spicula. Polypiferous cells homogeneous, *scarcely exserted* from the surface of the bark, scattered over the surface on all sides of the branches. Axis red. (See Ellis, Zooph. t. 13. f. 3, 4.)

Corallium, *Lamk.* 1813.
Isis, *Oken*, 1815.
Corallium, *Lamx. Bull. Soc. Phil.* 1812; *Lamk. Mém. Mus.* i. p. 407; *A. s. V.* 1816, ii. p. 295, ed. 2. ii. p. 468; *Schweigger, Beob.* 1819, t. 10; *Milne-Edwards & Haime, Corall.* i. p. 201; *Gray, P. Z. S.* 1867, p. 125.
Isis, sp., *Pallas, Elench. Zooph.* p.
Isis (nobilis), *Oken, Lehrb.* 1815, t. 2.
Gorgonia, sp., *Solander & Ellis, Zooph.* p. 90.
Madrepora, sp., *Linn. Syst. Nat.* ed. 10. p. 793.

101. Corallium rubrum. B.M.

Corallium, *Gesner, Fig. Lap.* 132.
Gorgonia incrustans, *Aldrov. Mus. Metal.* p. 290.
Corallium rubrum, *C. Bauh. Pin.* p. 366; *Rai. Hist.* i. p. 60; *Mercat. Metal.* p. 114.
Corallium, *Tournef. Inst.* p. 572, t. 339; *Marsil. H. Mar.* p. 108, t. 22. f. 29, p. 168, t. 40. f. 180.
Isis rubra, *Royen, Prod.* p. 521.
Corallium rubrum, *Donat. Adriat.* p. 43, t. 5; *Seba, Thes.* iii. t. 115, f. 1–7.
Isis nobilis, *Pallas, Elench. Zooph.* p. 223; *Linn. S. N.* ed. 12 p.
Madrepora rubra, *Linn. S. N.* ed. 10. p. 797; *Ellis, Corall.* p. 130, t. 35. f. *a, b, c.*
Gorgonia nobilis, *Gmel. S. N.* p. 3805.

Gorgonia pretiosa, *Solander & Ellis, Zooph.* p. 90, t. 13.
Corallium rubrum, *Cavolini, Polip. Mar.* t. 2; *Lamk. Syst.* p. 378; *Kölliker, Ic. Hist.* t. 16. f. 8, 9; *Milne-Edw. & Haime, Corall.* i. p. 201; *Gray, P. Z. S.* 1867, p. 126.
Corallium nobile, *Ehrenb. C. r. M.* p. 130; *Dana, Expl. Exped.* p. 140; *Gray, P. Z. S.* 1857, p. 287.

Hab. Mediterranean.

According to Risso, the animal almost always grows hanging from the underside of shelving rocks. The best coral is fished up from about 80 fathoms water; at 130 fathoms they are only found of a small size, and the animal ceases to reproduce its kind. It is sometimes found in only 15 fathoms water. He also described a reddish variety which is found in from 30 to 40 fathoms water, in the Mediterranean.

The rocks on which the coral is found are from 350 to 650 feet deep. It is said to attain a much greater perfection in places situated to the east than to the south; it is rarely found in a western, and never in a northern aspect. The fishermen divide the tract from the entrance of the Taro of Messina to the church of the Grotha into ten parts, and fish in one of the divisions in succession every year, so that the coral of each division is allowed ten years to grow; the average crop is 3000 lbs. per year. The fishery is considered a secondary and laborious occupation, and only followed by the fishermen when other employment cannot be obtained. (See Conch. Compan. p. 34.)

For the structure, growth, &c., consult M. L. Duthier's 'Histoire Naturelle du Corail; organisation, reproduction, pêche en Algérie, industrie et commerce.' Paris, 1864: 346 pages, and 20 coloured plates.

Ellis (Phil. Trans. l. t. 34. f. 10), finding red barnacles growing on a red coral, suggests that probably the fire-red tint of the coral might have been communicated to the barnacles as they grew together.

43. PLEUROCORALLIUM.

"Coral branching in a plane. Polype-cells scarcely raised, confined to one surface, mostly near the apex of the very small branchlets, and often in twos."

The branchlets in the figure are chiefly confined to one edge of the branchlets.

Pleurocorallium, *Gray, P. Z. S.* 1867, p. 126.

102. Pleurocorallium secundum.

Ramulose, branching in a plane; polypes confined to one surface, mostly placed at the apex of very small branchlets, and often in twos; axis calcareous, smooth, pale red or whitish; crust scarlet.

Corallium secundum, *Dana, Exped.* p. 641, t. 60. f. 1; *Gray, P. Z. S.* 1857, p. 287; *Milne-Edw. Corall.* i. p. 205.
Pleurocorallium secundum, *Gray, P. Z. S.* 1867, p. 126.

Hab. Sandwich Islands; 5 inches high.

44. HEMICORALLIUM.

Coral branched. Bark granular, even. Polype-cells conical, rather prominent, distributed on the upperside of the branches. Growing horizontally from the sides of rocks. Coral white.

Hemicorallium, *Gray, P. Z. S.* 1867, p. 127.

103. **Hemicorallium Johnsoni.** B.M.

Bark yellow.

Corallium Johnsoni, *Gray, P. Z. S.* 1860, p. 394.
Hemicorallium Johnsoni, *Gray, P. Z. S.* 1867, p. 127, not fig.

Hab. Madeira (*Johnson*).

The specimen from Liverpool figured as the animal of this coral (Proc. Zool. Soc. 1867, p. 126) is a fleshy Alcyonoid, parasitic on a stony coral.

Section IV. *Axis solid, continuous, hard, corneo-calcareous, sometimes more or less horny and flexible at the small branchlets.*

a. *Bark thin, granular; polype-cells more or less prominent.*

Fam. 14. ELLISELLADÆ.

Coral tree-like, generally furcately branched. The bark is granular, with a more or less distinct lateral groove on each side of the stem. Cells in series on the edges of the branchlets. Axis cylindrical, tapering, calcareous.

Gorgonellacées, *Valenc.*; *Milne-Edw. & Haime, Corall.* i. p. 182; *Kölliker, Ic. Hist.* p. 139.
Elliselladæ, *Gray, Proc. Zool. Soc.* 1859, p. 489.

A. *Polype-cells scarcely prominent.*

1. Juncella. Coral cylindrical, simple.
2. Ellisella. Coral cylindrical, furcately branched.
3. Ctenocella. Coral cylindrical, branched, fan-like, the branchlets from upper edge of branches.
4. Phenilia. Coral tree-like; branches subcylindrical, divaricated, sometimes coalescing.
5. Gorgonella. Coral secund or reticulated.

B. *Polype-cells elongate, prominent.*

6. Viminella. Coral subquadrangular, simple.
7. Reticella. Coral netted.
8. Verrucella. Coral branched; branches much branched, slender, with conical polype-cells on the edge.
9. Heliania. Coral tree-like, branches forked. Polype-cells in two, three, or four alternating series on the branchlets.

A. *Polype-cells scarcely prominent.*

45. JUNCEELLA.

Coral simple, subcompressed near the base; branches subcylindrical, with a more or less distinct lateral groove, especially at the base. Axis continuous, opake, solid, calcareous, hard at the base, white and softer above. Bark when dry granular, thin, with numerous series of sunken or slightly prominent polypiferous cells on each edge of the stems and branches.

Junceella, sp., *Valenc. Comptes Rendus*, xli. p. 14; *Ann. & Mag. Nat. Hist.* 1855, xvi. p. 182; *Milne-Edw. & Haime, Corall.* i. p. 186; *Kölliker, Ic. Hist.* p. 140.
Ellisella §*, *Gray, P. Z. S.* 1857, p. 287.

104. Junceella juncea.

Coral very simple, attenuated, rather flexuose. Bark thick, red, warty. Polype-cells slightly prominent, lateral line very narrow and indistinct.

Junci lapidei, *Plin. H. N.* p. 13, c. 25.
Palmijuncus albus, *Rumph. Amb.* vi. p. 126.
Keratophyton simplex, *Seba, Thes.* iii. t. 105. f. 1 *a* (good).
Gorgonia juncea, *Pallas, Zooph.* p. 180; *Esper, Suppl.* ii. t. 52; *Lamk. Mém. Mus.* ii. p. 158. n. 34; *Lamx. Polyp. Flex.* p. 419; *Dana, Exp.* p. 664.
Helicella juncea, *Gray, Proc. Zool. Soc.* 1859, p. 481.
Junceella juncea, *Valenc. Comptes Rendus*, xli. p. 14; *Ann. & Mag. Nat. Hist.* 1855, xvi. p. 182; *Milne-Edw. Corall.* i. p. 156; *Verrill, Bull. Mus. Comp. Zool.* p. 37; *Gray, P. Z. S.* 1857, p. 284; *Kölliker, Ic. Hist.* p. 140, t. 18. f. 45, 46.

Hab. Isle of Bourbon; Indian Ocean.

46. ELLISELLA.

Coral tree-like, furcately branched; branches spreading, and then ascending; lateral groove very narrow, but well-marked; the rest like *Junceella*.

Ellisella §**, *Gray, P. Z. S.* 1857, p. 287.

105. Ellisella elongata. B.M.

Coral elongate, smooth, forked and reforked; branches subcylindrical; bark reddish, cells in quincunx.

Gorgonia elongata, *Pallas, Zooph.* p. 179; *Esper, Suppl.* ii. t. 55; *Solander & Ellis, Zooph.* p. 96; *Lamk. Hist. A. s. V.* ii. p. 320; *Lamx. Polyp. Flex.* p. 419; *Dana, Exped.* p. 664. n. 50.
Ellisella elongata, *Gray, P. Z. S.* 1857, p. 287; 1859, p. 481.
Junceella elongata, *Valenc. Comptes Rendus*, xli. p. 14; *Ann. & Mag. Nat. Hist.* 1855, xvi. p. 182; *Milne-Edw. Corall.* i. p. 187; *Kölliker, Ic. Hist.* p. 140.

Hab. Mediterranean; West Indies (*Ellis*).

106. Ellisella coccinea. B.M.

Coral branched; branches very long, virgate, bright scarlet.

Ellisella coccinea, *Gray, P. Z. S.* 1857, p. 287; 1859, p. 481.
Gorgonia elongata, *Ellis & Solander, Zooph.* p. 96?

Hab. West Indies.

107. Ellisella gemmacea.

Coral branched, brownish yellow; branches numerous, cylindrical, distantly dichotomous; terminal branchlets elongate; bark very friable; polype-cells very prominent, rounded and bent towards the stem.

Gorgonia gemmacea, *Valenc. MS. Mus. Paris.*
Verrucella gemmacea, *Milne-Edw. & Haime, Corall.* i. p. 185, t. B². f. 7.
Junceella gemmacea, *Kölliker, Ic. Hist.* p. 140, t. 14. f. 4.

Hab. Red Sea.

108. Ellisella calyculata.

Junceella calyculata, *Valenc.* (not described).
Gorgonella calyculata, *Kölliker, Ic. Hist.* p. 140.

Hab. ——?

47. CTENOCELLA.

Coral branched, fan-like, expanded in a plane; branches with a series of virgate branchlets on the upperside, lateral line well marked but narrow.

Ctenocella, *Valenc.*; *Milne-Edw. & Haime, Corall.* i. p. 185.
Ellisella § ***, *Gray, P. Z. S.* 1857, p. 287.

109. Ctenocella pectinata. B.M.

Coral round; branchlets pectinate, all on the upperside of the branches, ascending, very long, acute. The lateral lines moderately distinct and deep.

Seba, Thes. iii. t. 105. f. 1*a* (central figure, good).
Gorgonia pectinata, *Pallas, Zooph.* p. 179; *Solander & Ellis, Zooph.* p. 179; *Lamk. Hist. A. s. V.* ii. p. 320; *Lamx. Polyp. Flex.* p. 416.
Gorgonella pectinata, *Kölliker, Ic. Hist.* p. 140, t. 18. f. 41.
Ellisella pectinata, *Gray, P. Z. S.* 1857, p. 287; 1859, p. 481.
Ctenocella pectinata, *Valenc. Comptes Rendus*, 1855, xli., *Ann. & Mag. Nat. Hist.* 1855, xvi. p. 182; *Milne-Edw. Corall.* i. p. 185.
Corail pectiné, *Bosc, Vers*, iii. p. 23.
Pterogorgia pectinata, *Dana, Exp.* p. 652. n. 17.

Hab. India; China.

48. GORGONELLA.

Coral flabellate, branched; branches subfurcate, flexuose, often anastomosing. Axis smooth, polished; base white, coral-like; upper part rod-like, solid; branchlets white, flexible. Bark when dry granular, minutely punctate, thin, with a *narrow continuous lateral*

groove. Polype-cells in a rather irregular series on each edge of the branchlets, rather prominent, roundish, white, with eight or ten radiating grooves from the apex; in two or three irregular interrupted series on each side of the main stem.

Gorgonella, *Valenc. Arch. du Mus.* i., *Ann. & Mag. Nat. Hist.* 1855, p. 182; *Milne-Edw. & Haime, Corall.* i. p. 183; *Gray, P. Z. S.* 1857, p. 284; *Kölliker, Ic. Hist.* pp. 139, 140.
Umbracella, *Gray, P. Z. S.* 1857, p. 289; 1859, p. 481.
Gorgonella, sp., *Verrill.*
Rhipidigorgia, sp., *Milne-Edw. & Haime, Corall.* i. p. 173.

110. Gorgonella umbracula.

Coral very much branched, fan-shaped, oblong, as broad as high, rather netted; branches rounded. Polype-cells prominent, wart-like.

Frutex lignosus &c., *Seba, Thes.* iii. t. 107. f. 6.
Gorgonia umbraculum, *Solander & Ellis*, p. 80, t. 10. f. 17, 86; *Lamk. Mém. Mus.* ii. p. 80, *Hist. A. s. V.* ed. 2. ii. p. 489; *Dana, Exp.* p. 658. n. 28.
Rhipidigorgia umbraculum, *Valenc. l. c.*; *Milne-Edw. Corall.* i. p. 178.
Umbracella umbraculum, *Gray, P. Z. S.* 1857, p. 288; 1859, p. 482.
Gorgonella umbracula, *Verrill, Bull. Mus. Comp. Zool.* p. 37.

Hab. North America.

Like *Rhipidigorgia laqueus*, but polypes more slender, placed laterally.

111. Gorgonella stricta.

Coral very like *G. umbracula*, but with the secondary branches straight, larger, and closer; polype-cells prominent, wart-like.

Gorgonia stricta, *Lamk. Mém.* n. 6.
Rhipidigorgia stricta, *Milne-Edw. & Haime, Corall.* p. 179.
Gorgonella stricta, *Verrill, Bull. Mus. Comp. Zool.* p. 37.

Hab. Cape of Good Hope.

"This species has all the external characters of the species quoted, but it has a calcareous axis."—*Verrill.*

112. Gorgonella granulata.

Coral yellowish, very much branched, flabellate, slender, somewhat reticulated; branches rigid, very brittle; bark yellowish, with blunt warts; axis brown, horny.

Gorgonia reticulum, *Esper*, t. 44 (without bark).
Gorgonia granulata, *Dana, Exp.* p. 660?
? Eunicea granulata, *Ehrenb. Cor. r. M.* p. 660.
Rhipidigorgia granulata, *Milne-Edw. & Haime, Corall.* i. p. 180.
Umbracella granulata, *Gray, P. Z. S.* 1857, p. 289; 1859, p. 482.
Gorgonella granulata, *Kölliker, Ic. Hist.* p. 140, t. 19. f. 12, t. 18. f. 43.

Hab. ——?

Var. orange, almost all the branches coalescing.

?Gorgonia reticulum, *Esper*, t. 44.
Gorgonia flexuosa, *Dana, Zooph.* p. 660, t. 60. f. 2; *Milne-Edw. & Haime, Corall.* i. p. 185.

Hab. Kingsmill Islands.

113. Gorgonella pseudo-antipathes. B.M.

Coral with the principal branches nearly parallel and almost cylindrical; network very loose and irregular, a few of the branchlets free; bark whitish, with very close irregularly placed warts.

?Gorgonia pseudo-antipathes, *Esper*, t. 54.
Gorgonia flabellum, *Esper*, t. 1.
Gorgonia cancellata, *Dana, Zooph.* p. 658.
Rhipidigorgia cancellata, *Milne-Edw. & Haime, Corall.* i. p. 179.
Gorgonella pseudo-antipathes, *Kölliker, Ic. Hist.* p. 140, t. 18. f. 42.

Hab. ——?

114. Gorgonella sarmentosa.

Coral branched; branches cylindrical, slender, anastomosing near the base, the last branches short; polype-cells slightly visible; lateral groove well marked.

Gorgonia sarmentosa, *Lamk. H. A. s. V.* ii. p. 326 (not *Esper*).
Gorgonia ceratophyta, *Delle Chiaje, A. s. V.* p. 26, t. 77. f. 1.
Eunicea sarmentosa, *Ehrenb. Corall.* p. 137.
Pterogorgia sarmentosa, *Dana, Zooph.* p. 633.
Gorgonella sarmentosa, *Valenc. Comptes Rendus*, xli. p. 14; *Milne-Edw. & Haime, Corall.* i. p. 183.

Hab. Mediterranean.

115. Gorgonella verriculata.

Coral with very slender coalescing branches; the polype-cells moderately but distinctly prominent.

Gorgonella verriculata, *Milne-Edw. & Haime, Corall.* i. p. 183.

Hab. Isle of France.

G. violacea and *G. cauliculus* are true *Gorgonia*, according to Prof. Kölliker, *l. c.* p. 139.

116. Gorgonella Cumingii. B.M.

Coral fan-like, broader than high; branches slender, cylindrical, diverging, radiating in a regular manner; branchlets slender, the terminal ones are spine-like.

Hab. Philippines (*Cuming*); the axis only.

B. *Polype-cells elongate or wart-like, prominent.*

49. VIMINELLA.

Coral simple, elongate, flagelliform. Bark thin; lateral space

broad, with a sunken line. Polype-cells cylindrical, prominent, in three or four series on each edge of the stem. Axis grey, calcareous.

Junceella, sp., *Valenc.*; *Milne-Edw. & Haime, Corall.* i. p. 186.

117. Viminella juncea. B.M.

Coral very long, flagelliform.

Gorgonia juncea, *Ellis & Solander, Zooph.* p. 81.
Juncella vimen, *Milne-Edw. & Haime, Corall.* i. p. 186.

Hab. Isle of Bourbon.

118. Viminella flagellum. B.M.

Coral tall and simple, with the very prominent warts curved inwards and arranged crowdedly in a band on each side of the axis, leaving a wide naked space on each side; colour white; axis greyish white, stony, and rigid.

Juncella extans, *Verrill, Bull. Mus. Comp. Zool.* p. 37.
Juncella flagellum, *Johnson, P. Z. S.* 1863, p. 505, *Ann. & Mag. Nat. Hist.* 1864, p. 142.

Hab. Azores (*MacAndrew*; *B.M.*); Fayal (*Verrill*); Madeira (*B.M.*).

119. Viminella hystrix.

"Coral simple, slender; cells very prominent, tubular."

Junceella hystrix, *Valenc. Comptes Rendus*, xli. p. 14; *Milne-Edw. Corall.* i. p. 186.

Hab. Bahia.

120. Viminella lævis.

Coral tall, simple, subcylindrical, rather slender, diminished in size, both at the summit and near the base, where the polypes become obsolete. Cells appressed, scarcely prominent, arranged in two broad bands, *leaving a narrow median naked space on each side, along which there is a well-marked groove*; they are placed alternately, at a distance of about $\frac{1}{5}$ inch, in about six vertical rows on each side, producing a quincunx arrangement. Axis slender, cylindrical, *calcareous*, white, surrounded by about sixteen longitudinal lobes, two of which are larger and correspond with the lateral grooves, the others with the rows of polypes. Length of single imperfect specimen 20 inches; diameter $\frac{1}{4}$ inch. Colour yellowish brown, in alcohol.

Juncella lævis, *Verrill, Proc. Essex Inst.* 1865, p. 189.

Hab. Hong-Kong.

121. Viminella (?) santa crucis.

Coral simple, rigid; axis cylindrical, yellowish, slender; bark cretaceous, white; cells irregularly disposed in a double row on each edge of the stem, unequal, some twice as large as others, smooth, terminal, small, and radiated; lateral area flat and naked, with a central groove.

Juncella santa crucis, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 113, t. 2. f. 1.

Hab. Island of St. Croix.

50. RETICELLA.

Coral fan-like, branched; branches inosculating from a network. Bark *rather* thin. Polype-cells wart-like, prominent on the sides of the branches. Axis calcareous, white.

Verrucella, § 1, *Milne-Edw. & Haime, Corall.* i. p. 184.

The sections are wrongly placed in Milne-Edwards and Haime's 'Coralliaires,' i. p. 184.

122. Reticella flexuosa.

Coral very much branched, fan-shaped, yellow brown; branches sometimes coalescing, but generally free, rather swollen near the end; bark thick, corky, very friable; polype-cells large, rounded, placed laterally.

Gorgonia flexuosa, *Lamk. H. A. s. V.* ii. p. 314.
Gorgonella flexuosa, *Valenc. l. c.* p. 14; *Kölliker, Ic. Hist.* p. 140.
Verrucella flexuosa, *Milne-Edw. & Haime, Corall.* i. p. 184.

Hab. China?

51. BRANDELLA.

Coral very much branched, very slender, linear; branches diverging, pinnate, and nearly parallel to each other; branchlets pinnate,

Fig. 8.



Brandella intricata.

opposite or alternate, diverging at nearly right angles, often sinuous, inosculating, uniting the diverging parallel branches into an irregular network. Bark, when dry, very thin, almost membranaceous, smooth, and slightly wrinkled. Polype-cells on all sides of the branchlets, alternate or opposite, cylindrical, short, smooth externally, with a convex 8-valved top. Axis very slender, thread-like, except the main stems, calcareous, hard, pale horn-colour, very brittle.

Brandella, *Gray, Ann. & Mag. Nat. Hist.* 1869, iii. p. 22.

123. Brandella intricata. B.M.

Coral fan-shaped, expanded. Stem very irregular; branches and branchlets regularly pinnately disposed, forming an irregular network; some of the uppermost branchlets free.

Raynerella aurantia, *Gray, l. c.* p. 22.

Hab. Bass's Strait, Dewi Reef (*T. M. Rayner*).

52. VERRUCELLA.

Coral much branched; branches free. Bark rather thick, smooth, spongy, and granular within. Polype-cells wart-like, very prominent on the edges of the branches. Lateral line smooth, narrow. Axis calcareous, branched, white.

Verrucella, § 2, *Milne-Edw. & Haime, Corall.* i. p. 184; *Kölliker, Ic. Hist.* p. 140.
Gorgonella, sp., *Valenc. Comptes Rendus,* xli. p. 14.

124. Verrucella guadalupensis.

Coral arborescent, fan-like; branches diverging; branchlets slender. Bark pale yellow, granular; axis whitish. Lateral grooves very narrow and deep; polype-cells conical on the sides of the branches.

Verrucella guadalupensis, *Duchass. & Michel. Corall. Antilles,* p. 33, t. 4. f. 5, 6, *Suppl.* p. 114; *Kölliker, Ic. Hist.* p. 140, t. 14. f. 5, 6, t. 19. f. 10, 11.

Hab. Guadaloupe.

Differs from *V. violacea* in the white granulations. See:—

1. Verrucella granifera, *Kölliker, Ic. Hist.* p. 140, t. 19. f. 5.

Hab. Coast of Africa.

2. Verrucella ramosa, *Kölliker, Ic. Hist.* p. 140.

Hab. Niné Island.

53. WRIGHTELLA.

Coral slender, rather compressed, furcately branched, of nearly the same diameter to end, expanded in a plane; branches slender, diverging, rather compressed. Bark white or crimson, thin, with a

well-marked lateral impression, with a powdery surface. Polype-cells convex, compressed, rather far apart on the sides of the compressed branches, with a central circular impression. Axis calcareous, articulated; joints elongate, translucent, cylindrical, strongly angularly longitudinally grooved; internodes very short, contracted; branches from the internodes.

"The coral articulated; the long joints or nodes are solid, composed of spicules tightly packed together, and are fluted. The internodes are small, and composed of a mass of loosely compacted spicules; the structure of the spicules of the central substance is straight; some of them are almost *fac-similes* of those figured in Kölliker's Icon. t. xix. f. 38–39."—*P. Wright*, Feb. 9, 1869.

125. Wrightella chrysanthos. B.M.

Coral furcately branched; branches divergent, compressed. Bark white. Tentacles yellow. Axis white.

Hab. Seychelles (*Dr. Perceval Wright*).

126. Wrightella coccinea. B.M.

Coral branched; branches divergent, compressed. Bark and axis bright scarlet; surface of bark retractile.

Hab. Seychelles (*Dr. P. Wright*); Ceram.

54. HELIANIA.

Coral arboreous, dichotomously branched; branchlets subsecund, ascending, divaricate; lower branches sometimes inosculating. Bark granular, hard, even. Cells produced, subcylindrical, short, rather incurved, placed in two, three, or four alternating series on the sides of the branchlets, and scattered rather irregularly on the branches. Axis hard, continuous, grey brown, calcareous.

Heliania, *Gray*, *P. Z. S.* 1859, p. 480.

127. Heliania spinescens. B.M.

Coral rather fan-like, more or less twisted; branches, especially the lower, conical, acute, spine-like, sometimes inosculating; upper branches subsecund.

Heliania spinescens, *Gray*, *P. Z. S.* 1859, p. 481.

Hab. Philippines (*Cuming*).

55. PHENILIA.

Coral tree-like; branches short, subquadrangular, divaricating, sometimes coalescing, forming an irregular netted frond; branchlets subclavate, some free. Bark granular; lateral groove distinct, scarcely sunken. Cells large, sunken, in two or three irregular rows on each side of the branches. Axis solid, hard, calcareous, horn-coloured.

Phenilia, *Gray*, *P. Z. S.* 1859, p. 482.

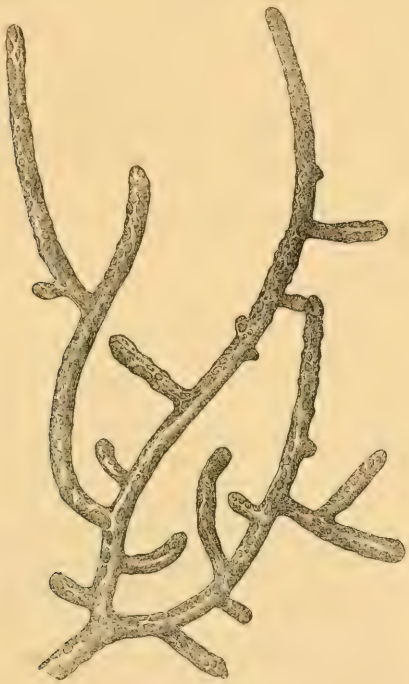
128. **Phenilia sanguinolenta.** B.M.

Coral yellowish; branches flexuous, interwoven; branchlets short, clavate, diverging; cells large, dark brick-red, making the coral look as if spotted with blood.

Phenilia sanguinolenta, *Gray, P. Z. S.* 1859, p. 482.

Hab. ——?

Fig. 9.



Phenilia sanguinolenta.

b. *Bark formed of large imbedded spicules; polype-cells adpressed to the sides of the branches, covered with well-marked spicules, mouth of cell spinose.*

Fam. 15. HYPNOGORGIADÆ.

Coral branched; branches numerous, drooping, pendulous; branchlets subopposite. Bark rough, with naked spicules. Calyces adpressed, adnate to the sides of the branches, formed of spicules, mouth large, ciliated. Axis calcareous, black.

56. HYPNOGORGIA.

Characters of the family.

Hypnogorgia, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 115.

MM. Duchassaing and Michelotti (*l. c.*) observe, "The disposition of the cells is sufficient to distinguish this genus from the genus *Blepharogorgia*, established by Mr. Gray in the Zoological Journal." I have not established any genus of that name; but they have described one themselves at p. 109 (Corall. Ant.); so it may be a slip of the pen.

129. Hypnogorgia pendula.

Coral branched in a plane; branches very numerous, drooping, and pendulous; branchlets subopposite; cells alternate or opposite, rather far apart. Axis black; bark purplish white.

Hypnogorgia pendula, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 113, t. 5. f. 2.

Hab. Guadaloupe.

c. *Bark formed of flat scales; polype-cells prominent, tubular or bell-shaped; scales very small.*

Fam. 16. CALLIGORGIADÆ.

Coral simple or flabellate, on one plane. Bark thin, formed of flat, angular, granulous spicules. Polype-cells subcylindrical, incurved, placed in whorls or in lateral series, with one, two, or three cells in a series. Axis hard, stony, calcareous, inarticulate, white or grey.

Primnoacea (part.), *Milne-Edw. & Haime, Corall.* i. p. 140; *Kölliker, Ic. Hist.* p. 135.

Synopsis of Genera.

* *Polype-cells subcylindrical, incurved at the apex. Bark white.*

1. Calligorgia. Coral fan-like; branchlets pinnate. Cells in whorls. Stem and branches cylindrical.
2. Xiphocella. Like *Callogorgia*, but stem and branches compressed.
3. Plumarella. Coral fan-like; branchlets pinnate. Cells in two marginal series.
4. Callicella. Coral fan-like; branchlets furcate, diverging. Cells in whorls.

5. Scirpearia. Coral simple. Cells in two marginal series.

6. Raynerella.

** *Polype-cells cylindrical, diverging at right angles with the stem or slightly ascending. Bark brown.*

7. Nicella. Coral fan-like, dichotomously branched.

* *Polype-cells incurved, in whorls or opposite.*

57. CALLIGORGIA.

Coral forked, fan-shaped, white; stem and branches cylindrical; branchlets pinnate, branched, diverging, forming a network, but free. Axis continuous, stony, subcylindrical. Bark thin, white, formed of flat angular imbedded granules. Cells in whorls of three, cylindrical, incurved, covered with small imbricate scales.

Callogorgia, *Gray, P. Z. S.* 1857, p. 286; 1859, p. 484.
Primnoa, § BB, *Milne-Edw. & Haime, Corall.* 1857, i. p. 140.

130. Calligorgia verticillata. B.M.

Coral elongate, round, pinnate; branches alternate, setaceous, rather branched; pores verticillate, rather horn-like.

Lithophyton, *Macgill. Hist. Mar.* p. 101, t. 20. f. 94–96.
Keratophyte or Sea-feather, *Ellis, Corall.* p. 60, t. 26. f. S, T, V.
Gorgonia verticillata, *Pallas, Zooph.* p. 177; *Gmel. S. N.*
Gorgonia verticillaris, *Solander & Ellis, Zooph.* p. 83; *Lamk. Mém. Mus.* ii. p. 446, *Hist. A. s. V.* ed. 2. ii. p. 507; *Lamx. Polyp. Flex.* p. 417, *Enc. Méth.* p. 446.
Primnoa flabellum, *Ehrenb. Corall. r. M.* p. 134.
Primnoa verticillaris, *Ehrenb. Corall. r. M.* p. 133; *Kölliker, Ic. Hist.* p. 135, t. 17. f. 12; *Milne-Edw. & Haime, Corall.* i. p. 140.
Muricea verticillaris, *Dana, Exp.* p. 675. no. 83 (note).

Hab. Mediterranean; Madeira (*Masson*, B.M.).

Var. Polype-cells 10 or 20, in whorls.

Gorgonia verticillaris, *Esper, Pflanz.* i. p. 156, t. 42.
Primnoa flabellum, *Ehrenb. Corall.* p. 134; *Milne-Edw. Corall.* i. p. 141; *Kölliker, Ic. Hist.* p. 135, t. 16. f. 3, t. 17. f. 11.
Callogorgia flabella, *Gray, P. Z. S.* 1859, p. 484.

Hab. Red Sea.

Var. Polype-cells small, 4, in whorls.

Primnoa verticillaris, *Col. du Mus. Paris*, fide *Milne-Edw. Corall.* i. p. 141.
Primnoa gracilis, *Milne-Edw. Corall.* i. p. 141.
Callogorgia gracilis, *Gray, P. Z. S.* 1859, p. 484.

Hab. West Indies.

"I refer *Primnoa verticillaris*, Ehrbg., to this species. Several branches, 8 or 10 inches long, obtained in 120 fathoms, off Sand Key, Florida. Compared with specimens from the Azores, in the Mus. Comp. Zool., some slight differences in the length of the calycles

and size of the scales were noticed; but they are not deemed sufficient to warrant a specific separation."—*Pourtales, Bull. Mus. Comp. Zool.* 1868, p. 130.

58. XIPHOCELLA.

The stem and branches compressed; edge sharp, shelving, and toothed by the scars of the branches; the rest like *Calligorgia*.

Hab. ——?

131. Xiphocella Esperii. B.M.

Gorgonia verticellata, *Esper, Zooph.* t. 42.

Hab. ——?

59. PLUMARELLA.

Coral fan-shaped, forked, expanded; branchlets pinnate, opposite or alternate. Bark thin. Cells elongate, clavate, incurved, alternate, in two rows on each side of the stem. Axis continuous, stony.

132. Plumarella penna. B.M.

Ashy, laxly branched, flattened; branches furcate, pen-like; pinnules two-rowed, crowded, filiform; cells papillary, ascending, two-rowed.

Gorgonia penna, *Lamk. Ann. du Mus.* ii., *Hist. A. s. V.* ii. p. 323.
Gorgonia plumosus, *Mus. Paris*, 1843.
Primnoa plumatilis, *Rousseau, MS. Mus. Paris*; *Milne-Edw. Corall.* i. p. 141.
Callogorgia plumatilis, *Gray, P. Z. S.* 1859, p. 484.

Var. Branchlets alternate.

Hab. New Holland.

A large and fine species, like a large *Sertularia*, branched and pinnate in a single plane. Polype-cells ascending like those of *Calligorgia verticillata*, but alternate and two-rowed.

G. plumosa.—Frond flat; branchlets opposite, pinnate, with two rows of paired cylindrical tubercles. Axis hard, rather stony (Mus. Paris, 1848).

60. CRICOGORGIA.

Coral branched, expanded on a plane. Stem slender, cylindrical; branches slender; branchlets pinnate, very slender, opposite or alternate. Polype-cells prominent, very close together, in a series at each side of the branchlets.

Cricogorgia, *M.-Edw. & Haime.*

133. Cricogorgia ramea.

Cricogorgia ramea, *M.-Edw. & Haime, Corall.* t. B². f. 6, not described.

Hab. ——?

This coral is like *Primnoa plumatilis*.

MM. Milne-Edwards and Haime figure, but do not describe nor mention in the text, a coral under the name of *Cricogorgia ramea* (t. B². f. 6), which appears to be allied to the foregoing genus.

61. CALLICELLA.

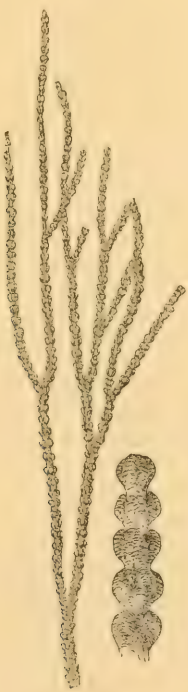
Coral flabellate, on one plane, much branched; branches dichotomous. Bark white, very thin. Polype-cells subcylindrical, short, incurved, in whorls, which are close together in a ring on the upper branchlets, further apart on the lower ones, and scattered on the stem. Axis white, stony; base expanded.

134. Callicella elegans.

Coral fan-like, oblong, as broad as high.

Hab. Formosa (*Swinhoe*).

Fig. 10.



Callicella elegans.

62. SCIRPEARIA.

Coral slender (simple or subsimple), rod-like. Axis slender, cylindrical, hair-like, solid, white, calcareous, attached by a broad base. Bark (when dry) thin, smooth, granular, with a series of subcylin-

drical polypiferous cells placed alternately on each side of the stem. *Lateral groove* indistinct.

Scirpearia, *Cuvier*, 1817; *Schweigger, Beob.* 1819, t. 10. f. 13.
Scirpearia, § 1, *Gray, P. Z. S.* 1859, p. 481.
Funiculina, sp., *Lamk.* 1816.
Gorgonia, sp.?, *Pallas, Zooph.* p. 370; *Blainv. Man. d'Act.* p. 515.
Pennatula, sp., *Pallas, Elench. Zool.*
Eunicea, sp., *Ehrenb.*?
Eunicea **, *Lamx. Polyp. Flex.* p. 439.

135. Scirpearia mirabilis. B.M.

Pennatula mirabilis, *Pallas, Zooph.* p. 371; *Linn. Mus. Reg.* t. 19. f. 4 (?), *Mus. Adolph. Frid.* xix. p. 4 (cop. *Phil. Trans.* liii. t. 20. f. 17); *Lamx. Enc. Méth.* p. 423.
Funiculina cylindrica, *Lamk. Hist.* ii. p. 423, ed. 2. iii. p. 640 (not synonym).
Scirpearia mirabilis, *Cuvier, R. A.* ed. 2. iii. p. 319; *Schweigger, Beob.* t. 2. f. 18 (*Lamk.* spec.); *Ehrenb. Corall. r. M.* p. 64; *Schweigger, Beob.* t. 2. f. 1 (from *Lamarck's* specimen, copied *Blainv. Man. d'Act.* t. 90. f. 4); *Gray, P. Z. S.* 1859, p. 481.
Pavonaria scirpea, *Blainv.* (see *Ehrenb.*).
Eunicea, sp.?, *Ehrenb.*; *Lamx. Polyp. Flex.* p. 434.
Gorgonia, sp., *Blainv. Man. d'Act.* p. 515.

Hab. St. Vincent, West Indies (Mus. Berlin, B.M.).

Pallas observes, "Descripsi hanc speciem ex abrupto utrinque semipedalem tamen longitudinem æquante exemplari ad Portum pulchrum Americes capto et *Asteriæ* singulari speciei intricato."

"Annon ad *Gorgonias* potius quam *Pennatulas* referenda, sed ambigo donec integram viderim quæ utrinque attenuatam liberamque stirpem exhibeat."—*Zooph.* p. 370.

Linnæus figures the coral as free, and furnished with polypiferous cells the whole of its length, and with attenuated ends. Schweigger figures the coral as free, with a thicker naked turned-up base, like *Pennatula*, with which he arranges it; but I am informed that in the Berlin Museum the specimen is attached to a rock by an expanded base.

Schweigger, in his 'Beobachtungen' (t. 2. f. 13), figured the specimen described by Lamarck.

136. Scirpearia funiculina.

Coral simple, flexible (free); cells two-rowed on each edge, small, chiefly adpressed near the tip; mouth small, stellate; bark thin, white; axis yellowish.

Juncella funiculina, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 116, t. 5. f. 7.

Hab. Guadaloupe.

"Like the next, but cells rudimentary, small."—*Duchassaing.*

137. Scirpearia barbadensis.

Coral simple, filiform; caudal base dilated; cells elongate, clavate

at the tip, attenuated at the base, tending upwards in a single series on each edge of the stem; bark with a median groove on each side.

Juncella barbadensis, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 116, t. 5. f. 5.

Hab. Barbadoes and Guadaloupe.

"Without any of the prominent lines on the bark seen in *S. funiculina*."—*Duchassaing.*

138. Scirpearia moniliformis.

Coral simple, filiform, erect; cells prominent, turbinate, alternate or scattered; apex umbilicate, subcylindrical; bark white, very thin, membranous.

Gorgonia moniliformis, *Lamk. Mém.* n. 24.

Hab. Australia (lower part only known).

63. RAYNERELLA.

Coral much branched, fan-shaped, expanded in a plane; branches and branchlets pinnate; branches diverging, subcylindrical, slender, nearly of a uniform size; branchlets opposite or alternate, diverging. Bark thin, with an even, very slightly corrugated surface; internally finely granular. Polype-cells prominent, roundish, close together, diverging irregularly on all sides of the slender branches; apex rather conical, contracted, with a central dot. Axis calcareous, hard, white, with well-marked longitudinal grooves.

Raynerella, *Gray, Ann. & Mag. Nat. Hist.* 1869, iii. p. 22.

139. Raynerella aurantia.

Coral orange-yellow; branches and branchlets diverging, pin-

Fig. 11.



Raynerella aurantia.

nate ; branchlets ending in a broader tubercle, simple, rarely forked.

Seba, Thes. iii. t. 100. f. 9?
Brandella intricata, *Gray, l. c.* p. 23.

Hab. Bass's Strait, Dewi Reef (*Rayner*).

** *Polype-cells cylindrical.*

64. NICELLA.

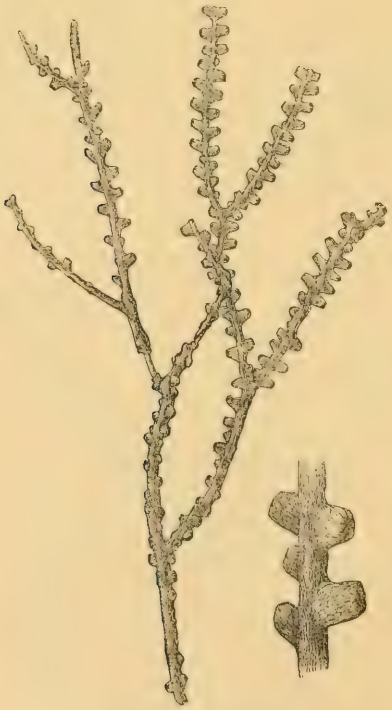
Coral fan-like, on one plane, branched ; branches forked, rather diverging. Bark smooth, brown. Polype-cells cylindrical, truncated, diverging from the stem at nearly right angles, mouth open. Axis calcareous, white, solid.

Scirpearia, § 2, *Gray, P. Z. S.* 1859, p. 481.

140. Nicella mauritiana. B.M.

Coral fan-like, dichotomously branched ; stem cylindrical, longitudinally striated ; bark thin, pale brown ; cells elongate, cylindrical,

Fig. 12.



Nicella mauritiana.

longer than the diameter of the stem, ascending, truncated at the tip, placed rather irregularly, subalternate (rarely subopposite) on each side of the stem and branches; axis pale greyish brown.

Scirpearia dichotoma, *Gray, P. Z. S.* 1859, p. 481.

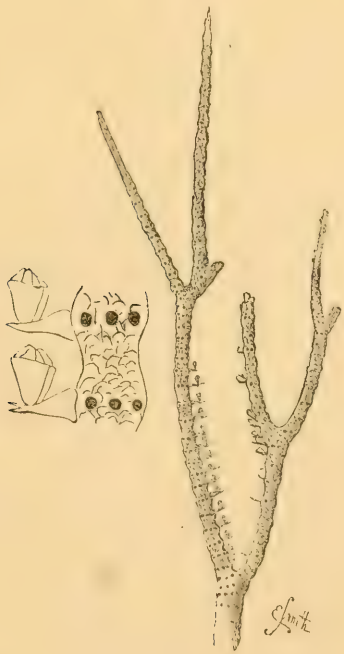
Hab. Mauritius.

† *Scales larger.*

Fam. 17. CALYPTROPHORADÆ.

Coral cylindrical, furcately branched; the branches elongate, subsimple. The axis *horny* (?) near the apex, cylindrical, tapering. Bark thin, entirely formed of a single series of thin lines and calcareous scales, with regular equidistant whorls of cells. Cells with a circular mouth having a raised edge, placed close together and forming a raised ring round the coral. Each cell is furnished with two obconic pellucid cells placed one on the other; the lower cell apparently articulated to the axis of the coral, very narrow near

Fig. 13.



Calyptrophora japonica.

the mouth of the cell and wide at the other end; the lower surface of the outer aperture is furnished with two elongated horn-like processes. To the centre of this basal cone is articulated or affixed a similar pellucid horn-coloured cone, or rather obconic vase, which is furnished with a slightly keeled ridge at its widest part, and then contracts, as if it had a shorter conical lid with an aperture in the middle of this lid-like contracted part for the emission of the polypes. The two cones are as it were articulated to the stem; and the lower cone stands at right angles with regard to it, and the upper at right angles with regard to the lower one, so that the aperture of the upper one is vertical.

65. CALYPTROPHORA.

Characters of the family.

Calyptrophora, *Gray, P. Z. S.* 1866, p. 25.

141. Calyptrophora japonica. B.M.

Calyptrophora japonica, *Gray, P. Z. S.* 1866, p. 25. f. 1.

Hab. Japan.

The cones are only preserved on the inner side of the branches, where they have been protected from erosion, during the voyage from Japan, by the branches opposite to them.

142. Calyptrophora trilepis.

"Branches irregularly and sparsely dichotomous, subflabellate. Branchlets very thin and flexible. Calycles in verticils of four, or more generally five, formed of three large cylindrical scales, joined angularly to each other, like the elbows of a stove-pipe. Aperture closed by eight triangular scales. The distance between the verticils is equal to or a little less than the length of the single polypes. The cœnenchyma is very thin, and covered with irregular imbricated scales. Axis hard and brittle, brown in the thicker branches, and yellow in the younger. By its simplified scales, this species makes an approach to the genus *Calyptrophora*, Gray."

Primnoa trilepis, *Pourtales, Bull. Mus. Comp. Zool.* 1868, p. 130.

A few small branches, 5 or 6 inches long, were obtained in 324 fathoms, off the Florida Reef.

Fam. 18. PRIMNOADÆ.

Coral simple or branched; branches forked or pinnate. The axis continuous, inarticulate, solid, containing a large portion of carbonate of lime, especially towards the base, where it is stony, but horn-like at the smaller branches. Bark formed of imbricate calcareous plates, without any distinct lateral groove or smooth lateral space. Polype-cells bent down on all sides of the branches, often arranged in whorls, very prominent, covered with imbricate scale-like spicules, usually smoother at the narrow base.

Primnoacea (part.), *Milne-Edw. Corall.* i. p. 138; *Verrill, Mem. Boston Soc. Nat. Hist.* 1862, i. p. 9; *Kölliker, Ic. Hist.* p. 135.
Primnoadæ, *Gray, P. Z. S.* 1857, p. 285, 1859, p. 483; *Ann. & Mag. Nat. Hist.* 1859, iv. p. 442.
Primnoa, *Lamx. Polyp. Flex.* p. 440; *Milne-Edw. & Haime, Corall.* i. p. 139.

A. *Polype-cells ovate, peduncled, large, scattered or in whorls on the branches.*

1. Primnoa. Coral tree-like, dichotomous. Cells ovate, bell-shaped, in threes.
2. Thouarella. Coral bottlebrush-shaped; branches subsimple. Cells ovate, solitary on the upperside of the branches.
3. Chrysogorgia. Coral cylindrical, furcately branched. Cells bell-shaped, sessile, scattered on the sides of the branches.
4. Fanellia. Coral fan-shaped, branches and branchlets compressed on a plane. Cells ——?
5. Rhsea. Coral branched, paniculate. Cells bell-shaped, largely pedicelled, racemose.
6. Myura. Coral simple. Cells ovate, in series on the sides of the stem.

B. *Polype-cells tubercular, on the sides of the branches.*

7. Swiftia. Coral branched, furcate. Cells conical, truncate, in two alternating series.
8. Thesea. Coral branched, branches slender. Cells subalternate.

C. *Polype-cells cylindrical or clavate, diverging, in two lateral series on the branches.*

9. Stenella.

D. *Polype-cells subcylindrical, reflexed, in a close cross series forming rings round the stem and branches, covered with scales externally.*

10. Narella. Coral furcately branched.

11. Primnoella. Coral unbranched.

E. *Polype-cells short, ascending, scattered on sides of axis.*

12. Bebryce. Coral furcately branched.

A. *Polype-cells ovate, peduncled, large, in whorls or scattered on the branches.*

66. PRIMNOA.

Coral branched, tree-like; branches cylindrical, forked. Bark formed of scales. Polypiferous cells ovate, clavate, dependent, covered with two series of large convex imbricate scales, placed in whorls of three round the branches. Aperture closed with three small pointed scales. The axis horny, black, solid, cylindrical, the base being often covered with a hard, calcareous, longitudinally striated outer coat.

"Calcareous bodies (spicula) generally scale-shape. The spicules of the cœnenchyma are small and scale-shape, and display a superficial layer, under which there is a thick stratum of soft web. In place of polype-cells the cœnenchyma forms large basins or cups of the shape of bent reeds, which in *Primnoa lepadifera*, which alone was more closely examined by me (compare Grube in Abh. d. schles. Ges. 1861, p. 170), membranous on the concave side, on the convex side are covered with large imbricated overlapping scales. At the mouth of the cup the scales form a ring and are eight in number, within which, in the retracted polypes, there is a coniform outstanding lid, which is formed out of eight long flat scales. Besides, the polypes at the base of the branches possess eight rows of small calcareous bodies (spicula), and indeed small outpressed double clubs covered with small warts and spines, approaching to simple spicules."

Primnoa, *Lamx. Bull. Soc. Phil.* 1812, p. 188, *Polyp. Flex.* p. 441, *Brit. Zooph.* p. 171; *Milne-Edw. & Haime, Corall.* i. p. 139; *Gray, P. Z. S.* 1857, p. 285, 1859, p. 483.

143. Primnoa reseda.

Coral alternately branched, diffused; bark with crowded, callous, recurved calyces.

Planta marina resedæ facie, *Clus. Exot.* l. 6. c. 6. p. 123; *Worm, Mus.* p. 234.

Reseda marina, *Besler, Mus.* t. 24; *Baster, Opusc. Subsec.* p. 130, t. 13. f. 1; *Pontopp. Nat. Hist. Norw.* i. p. 277, t. 13. n. 11.

Gorgonia reseda, *Pallas, Zooph.* p. 204.

Gorgonia lepadifera, *Gmelin, Syst. Nat.* p. 1289; *Solander & Ellis, Zooph.* p. 84, t. 13. f. 1.

Primnoa lepadifera, *Lamx. Bull. Soc. Phil.* iii. p. 188; *Kölliker, Ic. Hist.* p. 135, t. 14. f. 7, t. 17. f. 10; *Gray, P. Z. S.* 1859, p. 483.

Primnoa reseda, *Verrill, Mem. Boston Soc. Nat. Hist.* i. p. 9.

Lithoprimnoa arctica, *G. Grube, Abh. d. schles. Ges. f. Naturw. u. Med.* 1861, p. 165.

Hab. North Sea; Setubal (*Prof. E. P. Wright*); England (*Johnson*).

"Trunk large, arborescent, branching in a dichotomous manner, often very thick and stony near the base; branchlets round, tapering to slender flexible points. Cells large, campanulate, irregularly scattered; the cells are capable of moving in different directions, but in preserved specimens are generally turned downward. (Coll. Essex Inst.) St. George's Bay and Bay of Fundy, in deep waters; Northern Seas of Europe."—*Verrill, Mem. Boston Soc. Nat. Hist.* i. p. 9.

67. THOUARELLA.

Coral simple, with long, simple, filiform branches, spreading on all sides of the stem. Bark formed of large imbricate scales. Polype-cells smooth, bell-shaped, scattered on upperside of branches, covered with four or five series of imbricate scales.

Primnoa, § 2, *Gray, P. Z. S.* 1859, p. 483.

144. Thouarella antarctica.

Primnoa antarctica, *Valenc. Voy. Vénus*, t. 12. f. 2; *Milne-Edw. & Haime, Corall.* i. p. 140; *Gray, P. Z. S.* 1857, p. 286, 1859, p. 483; *Kölliker, Ic. Hist.* p. 135.

Hab. Falkland Islands.

68. HOOKERELLA.

Coral erect, fan-shaped, pinnate; branches simple, nearly parallel. Bark and polype-cells covered with large imbricate scales. Polype-cells bell-shaped, contracted at the base, open and fringed with larger scales at the mouths; in close series on the upper and lower sides of the branches, opposite to each other.

145. Hookerella pulchella.

Hab. Antarctic Ocean, 2 inches high. From Dr. Hooker's drawing no. 255.

69. CHRYSOGORGIA.

Coral branched at the base; branches thread-like, cylindrical; branchlets cylindrical, subequal, far apart. Bark thin, very brittle, covered with small scales. Polype-cells bell-shaped, sessile, contracted at the base, squamose, with a broad 8-lobed terminal mouth, placed irregularly far apart. Axis very short, amber-coloured.

Chrysogorgia, No. 1, *Duchass. & Michel. Corall. Antilles, Suppl.* pp. 107 & 115.

Like *Riisea*, except that the cells are sessile, not peduncled. Nearly allied to *Verrucella*; but the bark is less consolidated, and the cells further apart and elevated. Described by M. Duchassaing and Michelotti twice over, once in *Primnoaceæ*, p. 107, and again in *Gorgonellaceæ*, p. 115.

146. Chrysogorgia Desbonni.

Coral small, branched at the base; branches very slender. Bark white, thin; cells far apart, three or four times as thick as the branches; axis yellow.

Crysogorgia Desbonni, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 107, t. 1. f. 7, 8, p. 115, t. 4. f. 5, 6.
Riisea, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 108.
Riisea parnula, *D. & M. l. c.* p. 104.

Hab. Guadaloupe; 3 or 4 inches high.

† *Polype-cells ovate, pendulous, in series on the two sides of the axis.*

70. MYURA.

Coral elongate, simple. Bark white. Cells elongate, incurved, in two rows, one on each side of the stem, in an attenuated series; lateral groove distinct.

Myura, *Gray, P. Z. S.* 1859, p. 484.

147. Myura simplex.

Simple, filiform, whitish; cells claviform, transversely ridged, ascending, incurved, placed in alternate rows, one on each side of the stem.

Gorgonia myura, *Lamk. Mém.* n. 23, *Hist. A. s. V.* ii.; *Lamx. Polyp. Flex.* p. 420.
Muricea myura, *Dana, Exp.* p. 675. n. 84.
Primnoa myura, *Milne-Edw. Corall.* i. p. 142, t. 2 B. f. 3; *Kölliker, Ic. Hist.* p. 135, t. 17. f. 14.
Myura simplex, *Mus. Paris; Gray, P. Z. S.* 1859, p. 484.

Hab. ——?

71. FANELLIA.

Coral branched in a plane, flabelliform, consisting of several large branches arising from near the base, which give off alternately from each side numerous long, slender, acute branchlets, which rise at a very acute angle with the main branches, and are often again subdivided in the same way; branches and branchlets strongly compressed in the plane of the branches. Axis delicately striated, stony near the base, brown; the branchlets yellowish white, thick, tips setaceous. Height 24 inches; diameter of longitudinal branches $\frac{1}{4}$ inch. Cœnenchyma and polype not observed.

148. Fanellia compressa.

Primnoa compressa, *Verrill, Proc. Essex Inst.* 1865, p. 189.

Hab. Aleutian Islands.

72. RIISEA.

Coral branched, paniculate. Bark thin, cretaceous, smooth, with a distinct lateral groove. Cells alternate, largely pedicelled, bell-

shaped, with eight thick ribs; aperture closed with eight valves, striated longitudinally. Axis calcareous.

Herophylla, *Steenstrup, Over. K. D. V. S.* 1860, p. 121.
Riisea, *Duchass. & Michel. Corall. Antilles*, p. 18; *Kölliker, Ic. Hist.* p. 140, t. 18. f. 1 (Rusea, by misprint).
Riiseæ, *Sars.*

This genus is allied to *Funiculina* in the structure and disposition of the polypes when *Funiculina* begins to detach its branches. Arranged with *Primnoaceæ* by Dr. Kölliker.

149. Riisea paniculata.

Coral slender; bark orange, with a groove on each side of the principal branches; axis striated, yellow.

Riisea paniculata, *Kölliker, Ic. Hist.* t. 15. f. 7, t. 18. f. 1, 2; *Duchass. & Michel. Corall. Antilles*, p. 18, t. 2. f. 1, 2, 3.
Herophylla regia, *Steenstrup, Overs. K. D. V. S.* 1860, p. 121.

Hab. Barbadoes (*Riise*); 2 feet high and ½ foot in expanse with the root.

B. *Polype-cells short, broad, in alternating series on the two sides of the branches.*

73. SWIFTIA.

Coral branched. Bark thin, squamulose, without any spicules. Cells prominent, like mammæ, squamose, striated, mouths terminal, in alternate series, one on each side of the branches. Polypes cylindrical, hardened, with large decussated spicules externally. Axis —— ?

Swiftia, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 107.

150. Swiftia exserta.

Coral on a plane; branches and branchlets subdichotomous; cells prominent, alternate.

Gorgonia exserta, *Solander & Ellis, Zooph.* t. 15. f. 1; *Lamx.* (*not* Thesea exserta, *Duchass.*).
Swiftia exserta, *Duch. & Mich. Corall. Antilles, Suppl.* p. 107, t. 2. f. 4, 5.

Hab. Island of St. Croix.

74. THESEA.

Coral branched; branches slender. Bark formed of small scales and superficial spicules. Cells pustuliform, subalternate on the branches; outer surface formed of scales, and aperture terminal and radiate. Axis corneous (insoluble in muriatic acid).

Thesea, *Duchass. & Michel. Corall. Antilles*, p. 18; *Kölliker, Ic. Hist.* p. 137, t. 17. f. 18 (*not* G. exserta, *Solander & Ellis*).

Bark externally squamulose, internally with numerous spicules; cells externally scaly, subalternate, prominent; mouth radiated.

When the outer scales have fallen off, the bark is like *Acis*, Duchassaing.

Intermediate between *Muricea* and *Primnoa*.

151. Thesea exserta.

Coral branched; terminal branches very slender; bark very thin, deciduous, white, formed of scales; polype-cells very far apart, exserted, with eight valves.

Thesea exserta, *Duchass. & Michel. Corall. Antilles*, p. 18; *Kölliker, Ic. Hist.* p. 137, t. 17. f. 18 (spicules) (*not* G. exserta, *Solander & Ellis*).

Hab. West Indies.

152. Thesea guadalupensis.

Thesea guadalupensis, *Duchass. & Michel. Corall. Antilles, Suppl.* p. 106, t. 2. f. 2, 3.

Coral branched; branches flabellate, not coalescing, subequal, slender, rigid, few in number; bark white; cells subalternate, distant, like mammæ.

Hab. Guadaloupe.

C. *Polype-cells cylindrical or clavate, opposite, diverging from the branches in two lateral series.*

75. STENELLA.

Coral fan-shaped, in one plane, branched; branches furcate, radiating, slender. Bark thin, of thin scales. Cells cylindrical, opposite, in a series on each side of the branches, projecting nearly horizontal, covered with large scales, and closed with three horizontal valves.

153. Stenella imbricata. B.M.

Primnoa imbricata, *Johnson, P. Z. S.* 1862, p. 245; *Ann. & Mag. Nat. Hist.* 1863, xi. p. 299.

"White, having a tendency to branch dichotomously in one plane; the branches slender, flexible, not plume-like, and not anastomosing. Axis pale brownish yellow, spineless, obscurely striated, effervescing in hydrochloric acid, coated with small white scales composed of carbonate of lime. Over the lower coating of scales there is another coating of larger scales, with a wide space between the two; the outer coat, which is easily removed, appears to be attached to the peduncles of the cells. These peduncles are in closely set whorls of three or four, each of which expands into a cup-like cell, having its mouth closed in the dead coral with eight scales that have their apices in contact. The peduncles project at right angles from the stem, and are also clothed with scales.

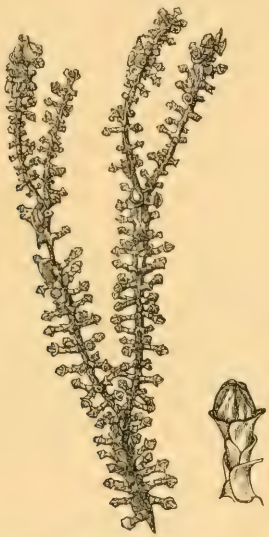
"This is a much more delicate form than *Primnoa lepadifera*, in which species the pedunculated cells appear to be arranged spirally on the branch.

"Two specimens of this elegant *Primnoa* have been obtained, the larger of which has a height of $8\frac{1}{2}$ inches, with a width of 11 inches. It was attached to a piece of *Lophohelia* (*Oculina*) *prolifera*. The whorls of the pedunculated cells are about three-twentieths of an inch apart, and the peduncles about the same in height. The principal

branch, near the base, has a diameter of one-fifth of an inch. The smaller example has been deposited in the British Museum."—*Johnson, l. c.*

Hab. Madeira.

Fig. 14.



Stenella imbricata.

D. *Cells close side by side, forming rings round the stem and branches.*

76. NARELLA.

Coral fan-like; branches cylindrical, dichotomous. Bark thin, white, fugacious, composed of small, thin, angular, plate-like spicules. Cell papilionaceous, whorled; whorls forming cylindrical rings round the stem.

154. Narella regularis.

Primnoa regularis, *Duchass. & Michel. Corall. Antilles*, p. 17, t. 1. f. 12, 13; *Kölliker, Ic. Hist.* p. 135, t. 17. f. 13.

Hab. Guadaloupe.

77. PRIMNOELLA.

Coral simple, elongate, cylindrical. Axis continued, stony. Bark granular, smooth. Polypiferous cells numerous, close-pressed, subcylindrical, regular, small, placed in close regular circles, each containing many cells round the stem; each cell covered with two series of small imbricate scales.

Primnoella, *Gray, P. Z. S.* 1857, p. 285; 1859, p. 483.

155. Primnoella Australasiæ. B.M.

Coral elongate, cylindrical, simple, unbranched, rather tapering; cells numerous, placed in close regular circles round the stem, each formed of two series of imbricate scales.

Primnoa Australasiæ, *Gray, P. Z. S.* 1849, p. 146, t. 2. f. 8, 9; *Ann. & Mag. Nat. Hist.* 1850, p. 510.
Primnoella Australasiæ, *Gray, P. Z. S.* 1857, p. 286; 1859, p. 483.

Hab. Australasian seas, on oyster-shells and stones.

Virgularia australis, *Lamk. A. s. V.* ed. 2. ii. p. 648; *Ehrenb. Corall. r. M.* p. 35, t. 3; *Herklots, Not.* p. 13.
Sagitta marina alba, *Rumph. Mus.* p. 34. n. 1; *Amb.* vi. p. 256; *Seba, Thes.* iii. t. 114. f. 2.

Seba represents this species as fixed to a stone. If this is the case, it must be *Primnoella Australasiæ*, the axis of which exactly fits this description:—

Axis cylindrical, subulate, very long, white, stout, truncated at the thickest end; the fracture radiately striated.

156. Primnoella vetusta.

Leiopathes vetusta, *Michel.*
Juncella vetusta, *Kölliker, Ic. Hist.* p. 176, t. 14. f. 12.
Primnoa vetusta, *Kölliker, Ic. Hist.* p. 176, t. 14. f. 9.

Hab. ——?

† *Polype-cells sunken, even with the surface of the bark.*

78. DICHOTELLA.

Coral cylindrical, tapering, branched; branches dichotomus, diverging. Bark moderately thick, granular, friable, brown. Polype-cells small, oblong, not elevated, in several longitudinal series on the edges of the branches in a quincunx, each placed in the middle of the upper margin of a white irregular-shaped scale; lateral lines very indistinct. Axis cylindrical, tapering, deeply longitudinally striated, hard, stony, calcareous, dark grey, tapering to a very fine point.

157. Dichotella divergens. B.M.

Branches dichotomous, cylindrical.
Hab. ——?

In a bad state, with the greater part of the bark lost, and only showing the polype-cells in two or three small spaces.

E. *Polype-cells short, cylindrical, ascending, on each side of the axis.*

79. BEBRYCE.

The coral is slender, cylindrical, elongate, furcately branched, with short, ascending, subcylindrical polype-cells, alternately on the sides of the stem and branches; polype-cells with eight valves.

"Coral tree-like, fixed, with a solid central horny flexible axis, and a spongy bark filled with calcareous particles. Polypes scattered, far apart, and not retractile."—*Philippi.*

Bebryce, *Philippi, Arch. Naturg.* 1842, pp. 1, 35, t. 1. f. 1; *Milne-Edw. & Haime, Corall.* i. p. 187; *Kölliker, Ic. Hist.* p. 137.

M. Valenciennes believes it is the axis of a *Gorgonia* covered with a colony of *Sympodium coralloides*. Professor Kölliker refers this genus to the family Primnoacea (Ic. Hist. p. 137).

158. Bebryce mollis. B.M.

Bebryce mollis, *Philippi, Wiegm. Arch.* 1842, p. 33, t. 1. f. 1; *Kölliker, Ic. Hist.* p. 137, t. 18. f. 1, 2, 3.

Hab. Mediterranean.

Bark in the dry specimen formed of two layers of spicules, which are very different from those in any other known coral. They are scale-like, with a central contraction, with more or less toothed processes, which project outwards from the middle of its length. The large scales have smaller and the narrow scales stronger median prominences, which are conical and branched at the tips (see Kölliker, t. 17. f. 2, 3). The spicules of the polype are warty.

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 00057 2883